SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE, PUBLISHED MONTHLY

VOLUME XX MARCH, 1915 NUMBER 3

UTERINE PROLAPSE WITH ASSOCIATED PELVIC RELAXATION[1]

BY C. H. MAYO, M.D., ROCHESTER, MINNESOTA

UTERINE prolapse as it is usually termed is in reality a form of hernia. The great majority of uteri take the retroverted position with the onset of prolapse. The retroverted position seems to be the common one of the uterus in over one-fourth of women, apparently in the majority of them without symptoms due to the position. It is possible for the uterus to undergo some degree of prolapse when it is in the vertical position; in such a case it moves forward nearer to the pubes and encroaches upon the bladder space. It is evident that a slight degree of descent may occur without necessarily being considered pathologic.

While there are many varieties of operations for the relief of the various types of uterine prolapse, there are only a few principles involved although various surgeons have made many modifications in technique.

In the majority of cases of retroversion, in patients between the ages of 20 and 40, in whom the symptoms are serious and growing worse, some form of external or intra-abdominal operation on the ligaments to restore the uterus to position is indicated.

For the cases of mild prolapse with retroversion or flexion without other intra-abdominal complications, for which an exploration would be advisable, a simple Alexander operation on the round ligaments or some modification of the original technique has proved very efficient.

With retroversion and descent difficult to replace because of probable associated pelvic lesions or other abdominal complaint the true condition of which had best be known, an intra-abdominal operation should be made on the round ligaments. If, as occasionally occurs, the cervix remains too far forward, the uterosacral ligaments or lateral folds of peritoneum should also be shortened to bring the uterus effectively to anteversion.

The interposition type of operation is very efficient in the relief of partial uterine prolapse associated with extensive cystocele. We have secured the best results from this method in cases in which there is a firm uterus which does not come out of the vagina in the anteverted position at operation. This usually means an age limit within the forties. This operation relieves cystocele and descent or the first and second degree of prolapse. In the third or fourth degrees of prolapse it should not be chosen. When made before the climacteric, it is advisable to divide and invaginate the tubes at the uterine horns to prevent any possibility of pregnancy occurring with such a misplacement of the uterus. The uterus being rotated from the extreme retroverted position to an anteversion—a rotation of 165 degrees—and the bladder separated from the anterior vaginal wall, the fundus of the uterus takes its place, the bladder resting on the fundus and posterior part of the anteverted uterus. Patients with relaxed

[1] Read before the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 15–17, 1914.

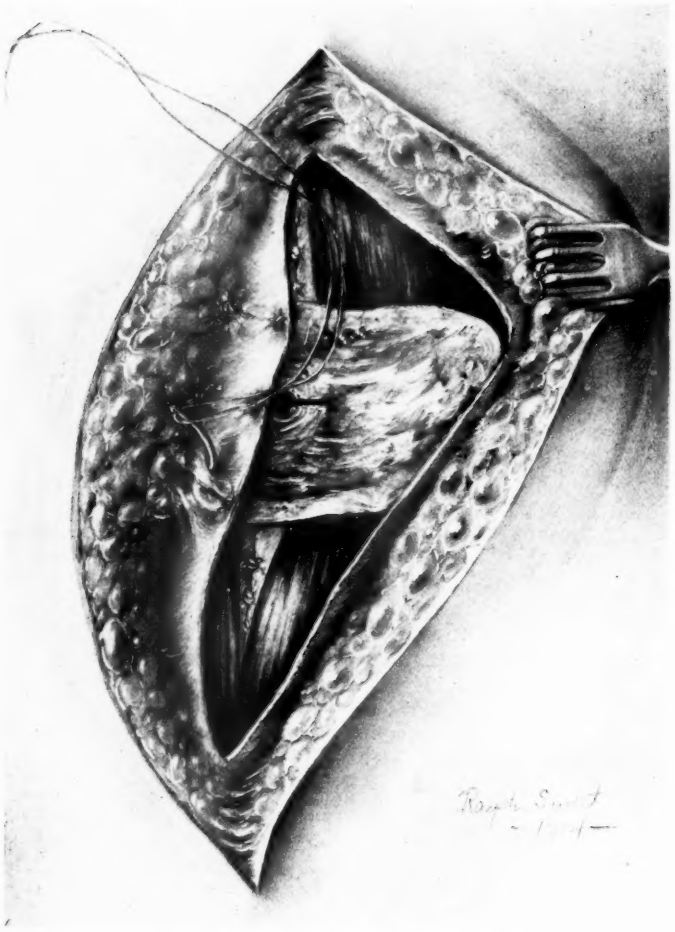


Fig. 1. Suture of aponeurosis to uterine muscle.

vaginal outlet and soft uterus may continue to feel some protrusion and often think the cystocele is still present. If this operation is applied to a woman in the fifties with a soft degenerating uterus undergoing rapid atrophy and in whom the torsion of the ligaments in anteversion still permits the uterus to be brought out of the body at the operation, it will undoubtedly fail of relief, and another method should be substituted. With the interposition operation in such cases we have seen within a few months the whole uterus come out of the vagina, broadside, followed by the bladder, the condition of the patient then being worse than before operation.

In another class of patients usually from fifty to sixty-five years of age where hysterectomy has been made without successfully supporting the cervical stumps or vaginal terminus, prolapse of the vagina with cystocele and rectocele may develop six months to ten years following the operation. Some of these patients of advanced years are best relieved by total extirpation of the vaginal

Fig. 2. Cross section of suspension operation.

mucosa with a complete closure of the vaginal outlet by an extensive restoration of the perineum, leaving exposed only a small area of mucosa around the urethra. Occasionally a suprapubic operation is effective in reattaching the stump of the cervix or upper vagina to the abdominal wall accompanied by an extensive perineal closure.

The Kocher operation, or some modification of it, is occasionally made upon women in the forties—in which case the tubes are divided—but the method is usually reserved for women past the change of life with atrophied uteri. In deciding what cases may properly be treated by this method, if, when the cervix is grasped and pushed well up, thus restoring the vaginal position, the cystocele is thereby greatly reduced, the operation will probably be successful. If, however, the bladder has been torn loose from its uterine attachment and the restoration of the uterus to high position does not elevate it, the Kocher principles of operation alone will not relieve the trouble. As a matter of fact it may be difficult to perform an operation which will securely fix the fundus of the uterus to and through the abdominal wall. The constant traction tends to cut out the sutures and while there is a string of adhesions the full support and elevation which apparently is satisfactory at the time of operation may not be permanent. As in the Murphy modification, the uterus is drawn through the abdominal incision and bisected anteriorly and

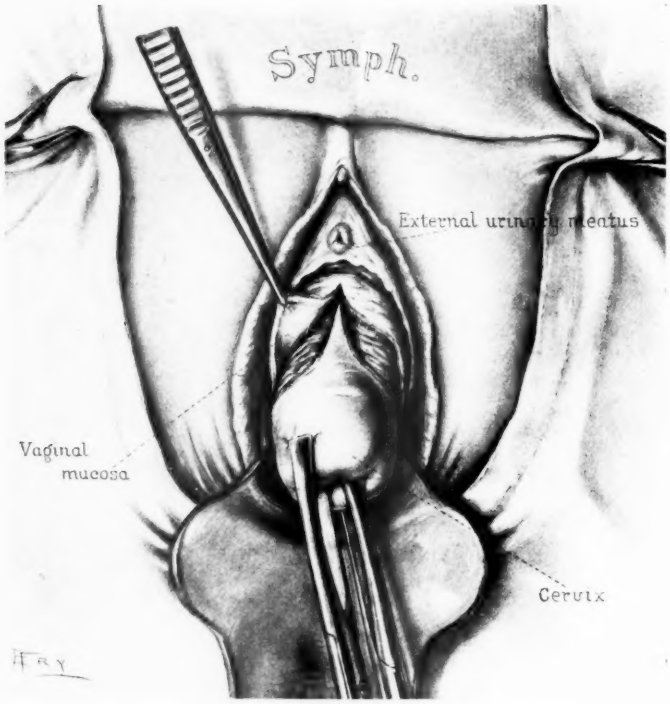


Fig. 3. Primary pear-shaped incision for vaginal hysterectomy.

posteriorly down to the internal os. Each half is turned outward and all of the mucosa dissected out above the internal os, leaving about a half thickness of the uterine wall. The peritoneum of the abdominal incision and the recti muscles are sutured all around the uterus at the level of the internal os. The aponeurosis is separated from the recti muscles opposite the projecting uterus. Each half of the fundus is turned outward over the recti muscle and beneath the aponeurosis to which they are secured by three mattress sutures on either side (Fig. 1). The aponeurosis itself and the recti muscles are now closed, and the aponeurosis over the cervical uterine tissue is again caught by two deep sutures to it. The abdominal wall is closed without drainage. The sutures which include the uterine muscle-tissue should not be drawn tight since the tissue easily cuts through. We have used silk and chromic catgut for sutures. It differs from J. B. Murphy's method only in placing the uterine tissue over the recti muscles and under the aponeurosis, leaving thereby a smoother abdominal wall and I believe makes a stronger support. After all, it is not the prolapse of the uterus or the varicose ulcers and erosions upon its exposed surface, but the cystocele and the malposition of the bladder, which are the cause of the patient's discomfort. Such ulcers and erosions as may be found are seldom painful and the exposed and vaginal mucosa becomes so near like skin that it is probably less irritable than it frequently is when undergoing the senile atrophy of the mucosa of the vagina at the menopause without exposure to the air. (Fig. 2.)

For a large group of cases of the third and fourth degrees of prolapse, in patients between 45 and 65 years of age, often with atrophy of the uterus and distention of the

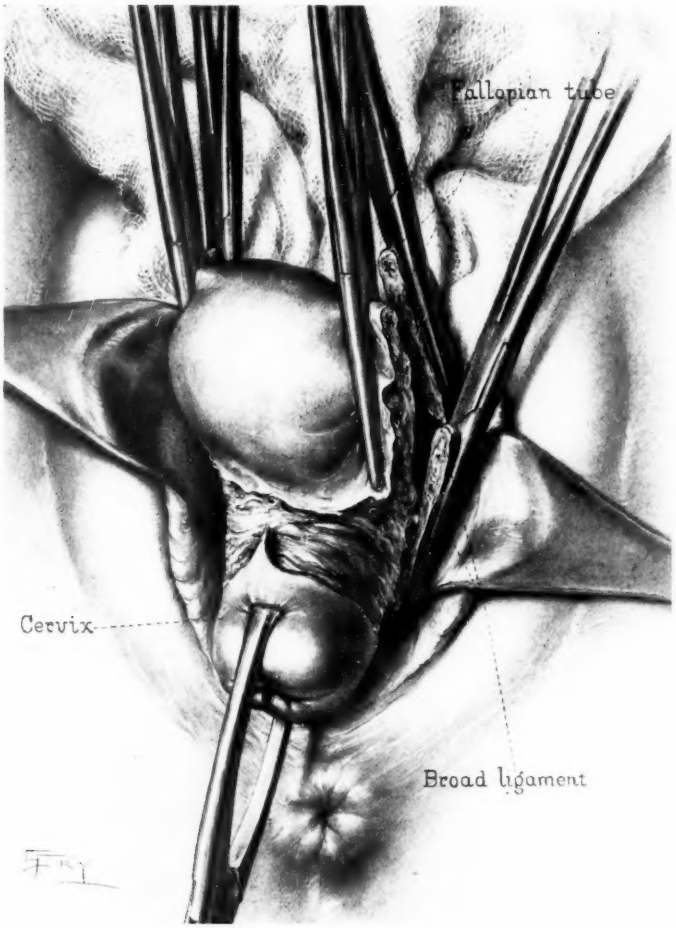


Fig. 4. Excision of uterus and clamping of broad ligament.

vaginal outlet, the interposition type of operation is not indicated. For such cases with separation of the bladder from the uterus, and a large cystocele in which the Kocher operation is also not indicated and the atrophy of uterus and ligaments too extensive for any intra-abdominal support to be secured, we have long practiced the following very effectual method of securing relief:

The cervix is grasped with two pairs of volsellum forceps and drawn well out of the vagina. A pear-shaped incision is now made with its apex one and one-half inches below the external urinary meatus. It passes down each side of the cystocele and around the cervix (Fig. 3). The sides of the incision are grasped and the vaginal wall readily separated from the bladder by blunt gauze dissection. The apex of the vaginal flap attached to the anterior lip of the cervix is turned down and the bladder rapidly separated by gauze dissection from the front of the uterus. As soon as the peritoneal fold is reached it is incised and divided laterally.

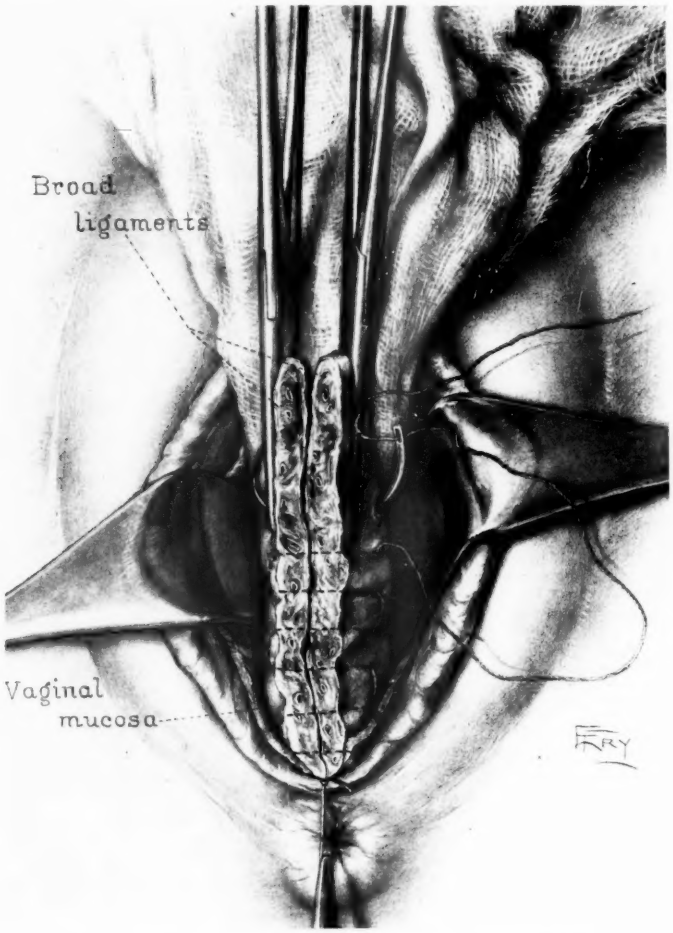


Fig. 5. Broad ligaments approximated by running mattress suture.

The blunt gauze dissection now separates the posterior vaginal wall from the uterus at the side and on to the broad ligaments. The sharp fork retractors are now used to draw the fundus of the uterus out of the incision as in an ordinary hysterectomy and the cervix is restored within the vagina. The broad ligaments are fully spread out on each side. Unless the ovaries are diseased they are not removed. A heavy hysterectomy forceps with long blades now grasps each broad ligament. The uterus is divided a half-inch from the forceps and two more pairs are applied, one on each side, with their tips catching the cul-de-sac behind the cervix. The uterus is then cut entirely away (Fig. 4). When the tissues are not sufficiently relaxed for easy approximation, a little of the lateral wall of uterine tissue may be left attached to the broad ligament.

If there is any tendency of the sigmoid or omentum to prolapse, it is held back by a long pad of gauze inserted into the peritoneal opening. The pairs of forceps, two on each

Fig. 6. Incision of perineal region with closure of anterior vaginal wall.

side, are now approximated laterally and a running mattress suture of chromic catgut is applied which passes back and forth behind the forceps completely through both ligaments at such a distance as to tighten the broad ligaments (Fig. 5). An approximation of from one to one and one-half inches of these ligaments is secured. The method of suture is applied so as to interlock and prevent the inward slipping of any vessels. When the suturing reaches the round ligament, it is caught into the angle of dissection where the bladder has been separated from the anterior vaginal wall. This suturing extends backward on each side from this point catching into the broad ligaments and then on each side into the angle of the depth of the dissection, thus compelling the bladder to rest on the broad ligaments. The loose ends of the exposed broad ligament are now approximated by a running buttonhole stitch extending back to the perineal position

and the sides of the vaginal mucosal flaps, and closed by a running catgut suture in a submucous manner (Fig. 6). No sutures are exposed.

By such an operation one secures all the advantages of the interposition operation without the disadvantages of atrophying uterus and muscles which will not support traction. The complete elevation of the bladder is secured and it rests on the broad ligaments which make a complete transverse pelvic support. Cystocele cannot form between the pubic bones and broad ligaments because their position is secured by suture. Formerly the broad ligaments were passed by each other overlapping like a double breasted coat and two rows of sutures were required. The present method is somewhat more simple, as effectual and safer, as no ends of vessels are left within the pelvic peritoneum. Perineal restoration is of course included in all operations for prolapse. These patients are usually confined to bed 10 days and remain slightly longer at the hospital.

UNUSUAL CASES ILLUSTRATING POINTS IN DIAGNOSIS AND TREATMENT[1]

I. A CALCIFIED LYMPH-GLAND PRODUCING SYMPTOMS SOMEWHAT SUGGESTIVE OF GALL-STONES.

II. AN OLD AND INFECTED ABDOMINAL PREGNANCY WITH EXTENSION OF THE LONG BONES INTO THE BLADDER AND INTO THE BOWEL.

III. A FURTHER CASE OF ADENOMYOMA OF THE RECTOVAGINAL Sseptum.

IV. OPERATION FOR THE RADICAL CURE OF AN UMBILICAL HERNIA IN A PATIENT WEIGHING 464 POUNDS.

V. REMOVAL OF A LARGE TUBERCULOUS CYST OF THE MESENTERY OF THE JEJUNUM, TOGETHER WITH THE CORRESPONDING SEGMENT OF BOWEL; RECOVERY; LATER DEATH, APPARENTLY FROM TUBERCULOUS MENINGITIS.

By THOMAS S. CULLEN, M.B., Baltimore

I. A CALCIFIED LYMPH-GLAND PRODUCING SYMPTOMS SOMEWHAT SUGGESTIVE OF GALL-STONES

MRS. C. S. was referred by Dr. S. Denny Willson and operated upon at the Church Home and Infirmary on June 9, 1914. In December, 1913, she had had sharp pain in the right lower abdominal quadrant and had been confined to bed for three days. There had been no vomiting at this time. In February, 1914, she had had a second attack and ten days before admission a third. During this last attack there had been vomiting and fever. Her previous history was unimportant save for the fact that there had been a slight tenderness in the right lower quadrant. In other words, the patient gave a definite history of a mild appendicitis and on one occasion there had been a yellowish tinge to the eyes.

Operation: I made a right rectus incision, not being absolutely certain whether the gall-bladder was involved or not. We removed the appendix, which was twice the natural size and contained a concretion. I examined the gall-bladder region and felt what appeared to be a stone. I accordingly lengthened the incision and then saw a stone beneath the junction of the cystic and common ducts (Fig. 1). This was irregular in outline, about 1.5 cm. in diameter and embedded in a little scar-tissue. It was gradually peeled out.

Dr. Paul Wegefarth, who was standing by my side, suggested that we were possibly dealing with a calcified lymph-gland. Both ducts were of normal caliber and free from induration. Neither the common nor the cystic duct was opened. A small drain was carried down to the point of removal of the stone. Examination of the so-called stone tended to show that it was really a calcified lymph-gland.

Dr. Wegefarth examined the stone chemically. With hydrochloric acid and also with nitric acid the stone substance dissolved completely, giving off carbonic acid. The test for bile was negative. A portion of the stone was ground up and then mixed with alcohol and ether. Examination of the residue was made for cholesterin with negative results.

There is no doubt that this apparent calculus represented an area of calcification. Its size, shape, and situation tend to show that it was a calcified lymph-gland. The chemical examination demonstrated conclusively that it bore no resemblance whatsoever to a gall-stone.

[1] Reported at the meeting of the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 16, 1914.

II. AN OLD AND INFECTED ABDOMINAL PREGNANCY WITH EXTENSION OF THE LONG BONES INTO THE BLADDER AND INTO THE BOWEL

Gyn. No. 13,806. L. S., aged 33, colored; admitted to the Johns Hopkins Hospital, May 3, 1907; discharged, June 26, 1907. Apart from the fact that the woman had never been strong the early history was unimportant.

The menses began at 13 and were regular. She married at 18. Two years later she had a miscarriage at the third month, and three years later a second at one month. Ten years after marriage she had a child. The labor was instrumental and there was much tearing. She was in bed two months with high fever, and had a great deal of vomiting and abdominal pain. After this the periods became too frequent, coming on practically every two weeks. Since a supposed miscarriage (three years before admission) the menses have occurred at irregular intervals of four to eight weeks; they have been profuse and have lasted from two to three weeks. The last period began April 7, 1907, and persisted for fourteen days.

Present illness: For the last five years the patient has had pain in the right lower abdomen, usually dull in character and occasionally accompanied by nausea. There have been no chills, no fever, and no vomiting. The abdominal discomfort is not present every day. It is aggravated by exertion.

Three years ago the patient was supposed to be pregnant. The periods ceased; there was morning sickness and later the perception of fœtal movements. There was colostrum in the breasts and abdominal enlargement. She developed severe abdominal pain which was labor-like in character. This lasted for five minutes and then suddenly ceased, but the patient passed only blood. Immediately after she noticed a hard tender lump in the right lower abdomen. This lump has gradually become smaller, as has also the abdominal enlargement. The patient has not lost in strength. There is no swelling of the feet, but dyspnœa has been noted on exertion, and for two months last winter there was a cough and occasionally night sweats. The patient has had a good deal of indigestion but no jaundice. She complains of burning in the urethra, micturition is frequent and scanty and the urine at times is mixed with blood. She has a profuse odorless but irritating vaginal discharge.

Fig. 1. A calcified lymph-gland embedded in adhesions and lying against the cystic and common bile-ducts. (Case 1.)

On admission to the hospital the patient did not look acutely ill. Her tongue, however, was furred. The pulse was a little rapid but of good volume. The abdomen was distended on the right side by an irregular nodular mass, which on palpation gave a peculiar feeling of crepitus differing from anything that I have ever felt. The mass was irregular but hard, like a myoma. On pelvic examination the cervix was found to be firm, the uterus slightly enlarged and in retroposition. On the right side was a mass which was apparently connected with the body of the uterus. The structures on the left side could not be palpated.

From the history and examination the condition was diagnosed before operation as an abdominal pregnancy. The patient was catheterized when under ether, and a large quantity of thick tenacious urine was obtained. In the bladder the catheter also encountered something which felt very much like a stone.

Operation, May 4, 1907: I made a median abdominal incision. The peritoneum was opened and at once disclosed a large irregular mass in the right lower abdomen, with the omentum densely adherent to it. After the omentum had been doubly ligated and severed, the upper portion was pushed back out of the way and the parts were carefully walled off. The large and small bowel were found to be densely adherent to the sac. The small bowel was dissected away as carefully as possible, but the outer coat was torn about 12 inches above the ileocæcal valve. This tear was immediately repaired with a continuous Pagenstecker suture.

On opening the sac I found it contained a large number of fœtal bones, as indicated in Fig. 2. After removing the greater number of the bones I attempted to enucleate the sac. The left tube and ovary were now removed and the sac on the right side was gradually loosened up. The bladder was found densely adherent and connected with the extra-uterine mass. After being freed by blunt

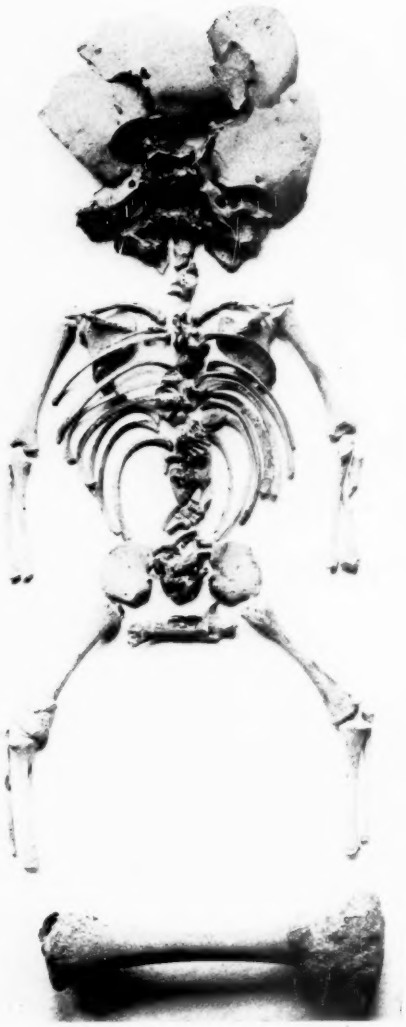


Fig. 2. Fœtal bones contained in the abscess sac of an old abdominal pregnancy. These have been roughly placed together. One end of the long bone (at the bottom of the picture) is much thickened. This is due to the fact that it had ulcerated through into the bladder, where it had become encrusted with phosphatic deposits. This bone has been photographed on a larger scale than the others.

dissection, it was noted that one of the long bones projected into the bladder and that the portion within the bladder was covered with a thick deposit of urinary salts (Fig. 2). The bladder opening was closed with catgut and with a continuous Pagenstecker suture. The enucleation of the sac was continued until it was delivered from the abdomen. The large bowel was then examined. There were two openings in the cæcum, one at the junction of the ileocæcal valve. The vermiform appendix was thickened and indurated. It was situated 2 cm. from this hole in the cæcum. The appendix was removed and the hole in the bowel closed in with two continuous Pagenstecker sutures. The second opening in the cæcum was 6 cm. from the ileocæcal valve. This was drawn up into the wound and sutured in a similar manner with two continuous Pagenstecker sutures. The holes in the bowel had been made by the ends of the long bones which had ulcerated through and were projecting into the lumen.

A parovarian cyst was also removed from the right side. A cigarette drain was placed in the lower angle of the incision and carried down to the cæcal region and also into Douglas' cul-de-sac. Owing to the difficulty in getting adequate exposure at the beginning of the operation the right rectus muscle was cut through.

The patient was returned to the ward in a very weakened condition. She had a quiet night, but was much nauseated and saline infusions were given. On May 6 the retention catheter which had been left in the bladder was removed. On May 7 a note was made that the nausea still continued. The patient gradually improved, although the abdominal incision broke down over a considerable area. After several days a small amount of urine commenced to escape from the abdominal wound. On June 25 it was noted that the wound looked very well. The leakage of urine had ceased. On the day of her discharge, June 27, the following note was made: "The abdominal incision has healed well. There is no tenderness, but still a little thickening of the incision. The patient has gained in weight and has generally improved. A No. 9 cystoscope was introduced into the bladder. No reddening was found. The mucous membrane was everywhere white, glistening, and smooth, and the bladder-vessels were not injected. The urine was perfectly clear."

Path. No. 11,534. Sections from the wall of the sac show that it consists partly of omentum, partly of granulation tissue, which is very œdematous. The right ovary is œdematous and cystic and measures 6.5 x 5.5 x 3 cm.

In this case the uterus had evidently ruptured at the time of the patient's severe pain and the fœtus had escaped into the right lower abdomen. A slow inflammatory process had gradually developed, and eventually the ends of the long bones had been forced through into the bowel and bladder.

III. A FURTHER CASE OF ADENOMYOMA OF THE RECTOVAGINAL SEPTUM

At the last meeting of the Southern Surgical and Gynecological Association I reported two cases of this character. At that time, I referred to two instances recorded by Cuthbert Lockyer and also mentioned two specimens sent me by Dr. D. S. Jessup.

Dr. Jessup has since reported his two cases in full in the Section on Pathology and Physiology of the American Medical Association, 1914. Recently another patient with adenomyoma of the rectovaginal septum has come under my care.

Miss K. T., aged 30, was referred to me by Dr. Alexius McGlannan, October 16, 1914. I first saw this patient at the Johns Hopkins Hospital on November 10, 1906. At that time I removed the left tube and ovary and resected a portion of the right ovary. The appendix was also removed. When I saw her again she complained that she was incapacitated for two days before and after her period and that her suffering was almost unbearable. She was well nourished, weighed 170 pounds, and for the previous two or three months she had been having about six bowel movements a day. The stools had been normal in color. Her discomfort had been so great that she insisted on having something done.

Operation, October 19, 1914: On opening the abdomen we found adhesions everywhere in the pelvis, and the rectum was almost completely obstructed just posterior to the cervix. We found it necessary to do a complete hysterectomy. This was accomplished with much difficulty. The ureters on both sides were outlined and the uterus was removed. The cervix was so densely adherent to the rectum, over an area about 2.5 cm. in diameter, that it was necessary to cut through this tissue, which was almost as hard as gristle. The rectum was carefully examined and found to be almost completely obstructed. It was then brought up as far as possible. Its peritoneum was severed but its vessels were not disturbed. After the rectum had been freed for about eight inches the pelvis was packed with gauze and the anal margin all the way around was incised just as for an extensive Whitehead operation. About eight inches of rectum were then drawn through the anus and removed together with the growth. The rectum was then attached to the skin. The patient did not lose very much blood considering all that was done.

After she was returned to the ward her pulse steadily increased, although there was no evidence of hæmorrhage. About seven hours after operation signs of sudden cardiac dilatation developed and the patient soon died.

The growth, situated between the cervix and the rectum, was intimately blended with both. It was

Fig. 3. Adenomyoma of the rectovaginal septum. The upper dark ribbon is rectal mucosa, which is intact. Intimately blended with the rectum is a well-defined and relatively circumscribed growth. Scattered throughout it are isolated glands surrounded by stroma and large islands of typical uterine mucosa. For the appearance under the high power see Fig. 4.

Fig. 4. Adenomyoma of the rectovaginal septum. This is one of the islands of mucosa seen in Fig. 3. The glands are identical with those of the uterine mucosa, and they lie embedded in the characteristic stroma of the mucosa. This shows some small round-cell infiltration. Surrounding this island is the usual diffuse myomatous tissue.

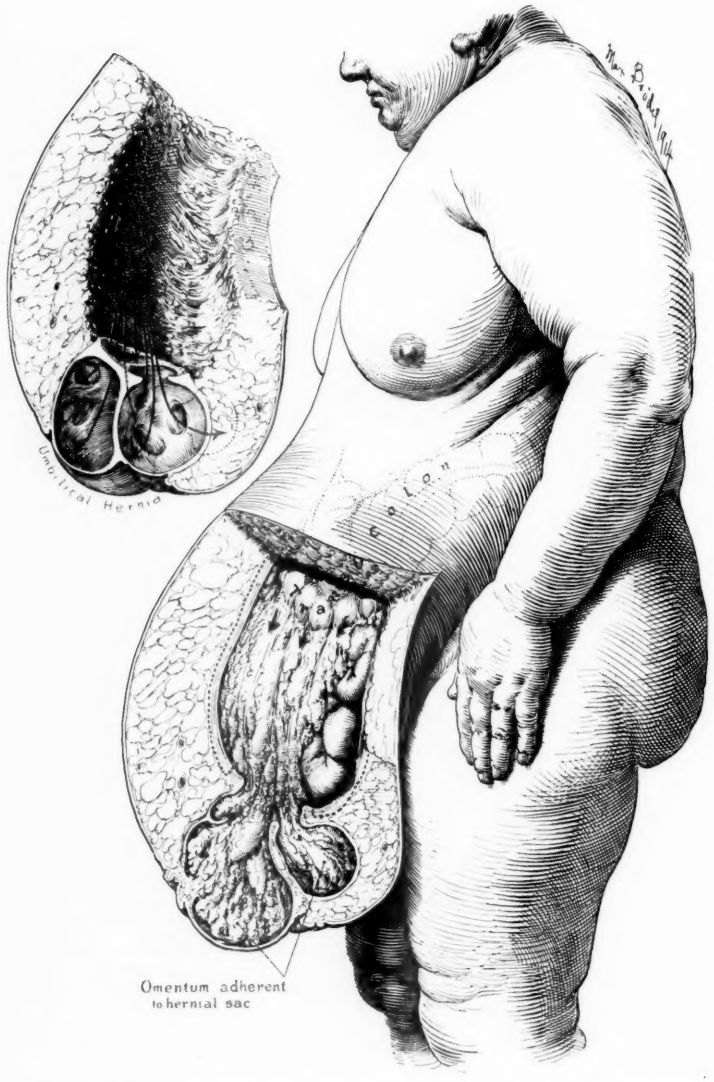


Fig. 5. An umbilical hernia and a markedly pendulous abdomen in a patient weighing 464 pounds. This is a sketchy outline of the condition found. With the patient standing the dependent portion of the abdomen reached the knees. As the omentum was adherent to the hernial sac the transverse colon was markedly drawn downward. The dotted line indicates the line of dissection, the fat of the abdominal wall being removed down to the fascia. The hernial sac was divided into numerous secondary cavities. This is particularly well seen in the upper sketch of the hernial sac, which was drawn after removal.

about 3 x 2 cm., very dense in texture, and projected into the lumen of the bowel. The rectal mucosa itself was intact, normal, and showed no evidence of ulceration or inflammation. In some places the muscle of the myoma was continuous with that of the bowel. At other points a little adipose tissue intervened or lobules of fat were surrounded by nonstriated muscle.

Scattered throughout this myomatous growth, which was diffuse in character, were islands of uterine mucosa (Figs. 3 and 4). In some places just a triangle of the typical stroma of the mucosa was visible. At other points were isolated glands, surrounded by stroma; or a small cavity was seen lined with cylindrical epithelium, which had glands extending into it. In other places there were large areas of uterine mucosa surrounded by the characteristic stroma, or there was a long drawn out ribbon-like mass of stroma with one or two long and tortuous glands lying in it. In some sections there was a definite area of mucosa, at least 8 mm. long by 3 mm. broad. Here, with the low power, the mucosa occupied more than one field, no muscle being visible. Such areas are really miniature uterine cavities.

The growth is a typical adenomyoma of the rectovaginal septum, evidently starting in or near the cervix and gradually invading the rectum by continuity, but respecting the rectal mucosa at all points. The bowel was so nearly obstructed, however, that we were forced to remove at least 8 inches. The ideal method would have been to excise the area of the growth and then close up the defect.

IV. OPERATION FOR THE RADICAL CURE OF AN UMBILICAL HERNIA IN A PATIENT WEIGHING 464 POUNDS

Mrs. C. J., aged 35, was admitted to the Church Home and Infirmary, February 11, 1914. She had had five children, the youngest being eight months old. At the time of her marriage she weighed 225 pounds. Her weight on admission was 464 pounds. She complained of an umbilical hernia which was about 10 cm. in diameter. When on her feet, the abdomen hung down to the knees. The dragging sensation caused thereby was so great that she was forced to keep off her feet as much as possible.

Operation, February 12, 1914: I was unwilling to operate and explained the danger to her husband. The patient, who is still a relatively young woman, said she was becoming a semi-invalid and insisted that she be relieved. On account of the marked redundancy of the abdominal wall, we decided to remove a large quantity of fat with the hernia, as advocated by Dr. Howard A. Kelly. Accordingly a large transverse, elliptical area was outlined (Fig. 6). This area, when measured after removal, was 36 inches from side to side and 19 inches from above downward. The adipose tissue of the tremendous flap was dissected from the fascia of the abdominal wall all around as far as the neck of the hernia. Then, with the finger in the abdomen as a guide, the neck of the sac was cut at its approach to the abdominal wall. The dotted line in Fig. 5 indicates the line of dissection. The omentum in the sac was so intimately blended with the walls of the sac that this portion was cut off and removed together with the sac and redundant tissue.

In the upper sketch in Fig. 5 Mr. Brödel has clearly shown the neck of the sac and the numerous chambers passing off from it. The hernial opening was closed by the Mayo method of sliding the fascia of the lower margin of the opening up under that of the upper margin. We used kangaroo tendon for the mattress sutures and, after the first row had been placed and tied, the edges of the upper flap were

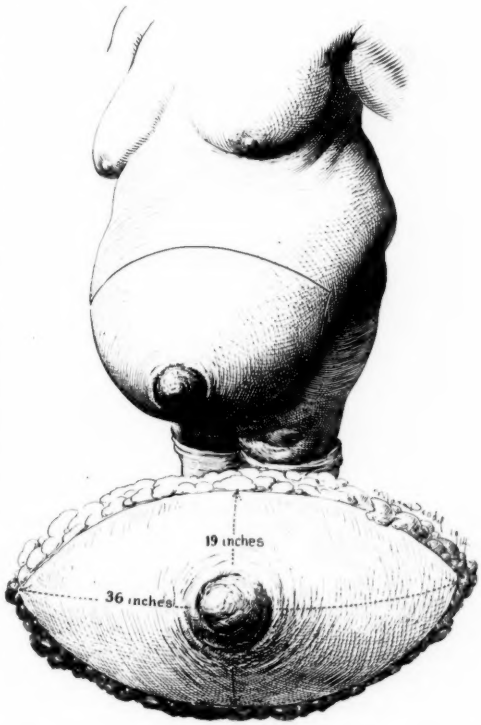


Fig. 6. An umbilical hernia associated with marked prolapse of the abdominal wall. The umbilical hernia was about 10 cm. in diameter. The elliptical transverse incision is indicated by the black line. The lower figure indicates the shape and size of the piece of adipose tissue removed.

fastened down with a second row of mattress sutures. The abdominal wound was now approximated by interrupted silver wire and silkworm-gut sutures. Accurate skin approximation was obtained by continuous black silk thread. At each end of the incision a protective drain was introduced.

The patient made a speedy recovery and the abdominal wound healed perfectly. When the stitches were removed the abdominal incision had contracted until it measured only 27 inches from side to side. The patient, eight months later, was in excellent health.

V. REMOVAL OF A LARGE TUBERCULOUS CYST OF THE MESENTERY OF THE JEJUNUM, TOGETHER WITH THE CORRESPONDING SEGMENT OF BOWEL; RECOVERY; LATER DEATH, APPARENTLY FROM TUBERCULOUS MENINGITIS

Baby R., a frail girl, 2½ years old, was referred to me by Dr. Julius Friedenwald and Dr. Harry Goldberg on May 27, 1914.

Two weeks before her admission to the Church Home and Infirmary a tumor was first noted in the upper abdomen. This was globular, appeared to be about 10 cm. in diameter and could be pushed from one side of the abdomen to the other. It lay somewhat to the left of the median line.

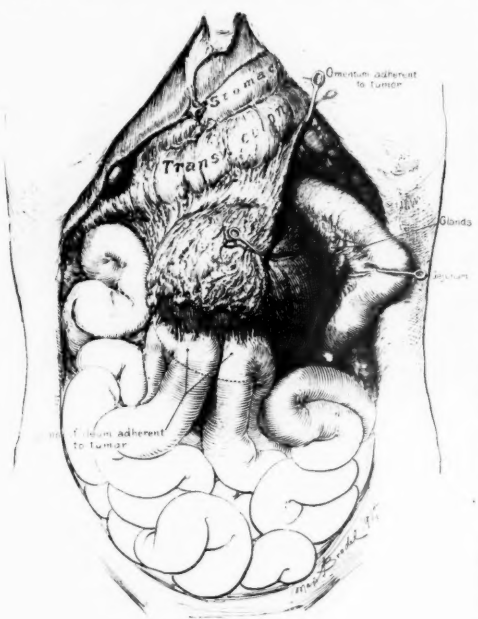


Fig. 7. A tuberculous cyst springing from the mesentery of the jejunum. The cyst was globular, occupied the center of the upper abdomen and was partly covered by adherent, red, and greatly thickened omentum. Below it was adherent to several loops of small bowel. The omentum was severed near the transverse colon and the loops of small bowel were liberated. The cyst was then gradually loosened, as far as feasible, from its attachment to the mesentery. The loop of jejunum here shown was thickened, but at operation seemed to be normal. A glance at Fig. 8, however, demonstrates that its mucous coats are much thicker than usual. In the mesentery of the jejunum are markedly enlarged lymph-glands.

There was a leucocytosis of 15,000. The urine was normal. The history gave absolutely no clue as to the probable character of the growth. The majority of those who saw the patient thought that the tumor was probably an enlarged left kidney, but no one ventured a positive diagnosis.

Operation: I made a median abdominal incision, commencing a short distance below the xiphoid and ending near the umbilicus. The tumor lay below the transverse colon and was covered over by a greatly reddened, thickened, and adherent omentum (Fig. 7.) The omentum was cut across near the transverse colon and we gradually loosened up the cystic tumor, freeing it from several loops of small bowel and separating it from the adherent mesentery. After getting good exposure, we found that the tumor sprang from the mesentery of the jejunum. We continued our dissection, hoping that it would be possible to completely enucleate the cyst without injuring the blood supply of the jejunum. When this had been almost accomplished, the tumor having been freed except over an area of about 3 x 3 cm., a little pus commenced to escape. Fortunately, the tumor was at this stage of the operation mobile enough to be partially lifted out of the abdomen. It was slit open and evacuated into a large basin with little or no contamination to the abdominal contents. The sac contained about 700 ccm. of a rather thin greenish yellow, odorless pus. When empty it was clamped off and removed. It was then found that the blood supply of a large area of the jejunum had been cut off, as the same vessels that supplied the tumor also supplied the bowel. It was further seen that no matter in what manner the sac had been removed the blood supply of the bowel must of necessity have been cut off. The portion of the jejunum which had lost its blood supply was clamped and cut (Fig. 7). Both ends were closed and a lateral anastomosis was made. It had been necessary to cut off the jejunum about three inches from the point where it passed to the left over the vertebral column. This short end naturally made the anastomosis rather difficult. A cigarette drain was carried down near, but not to, the point of anastomosis and the abdomen closed.

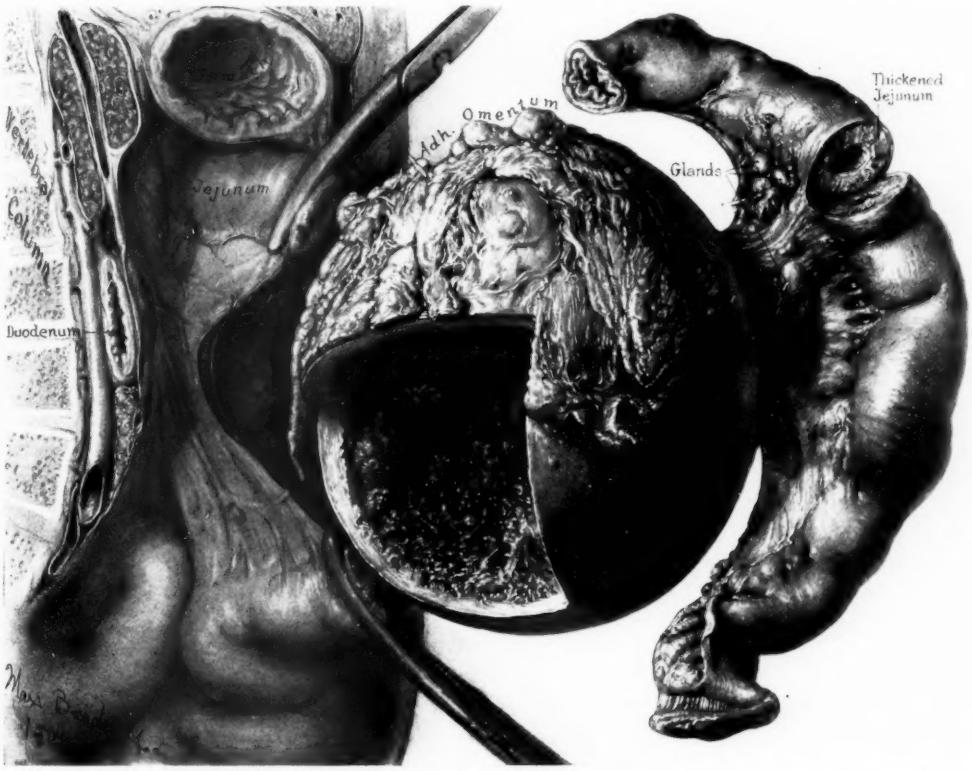


Fig. 8. Tuberculous cyst of the mesentery of the jejunum. Resection of the jejunum together with the cyst. Temporary recovery. The right half of the drawing showing the mesenteric cyst and the jejunum is an accurate portrayal of the specimen removed. The left half gives a more or less schematic representation of the relation of the cyst to the body. The cyst was spherical, had a definite basal mesenteric attachment, about 3 x 3 cm., and was covered with greatly thickened indurated omentum. The cyst walls varied from 2 to 3 mm. to 1 cm. or more in thickness. The inner surface presented a friable, worm-eaten appearance and the pus was odorless, rather thin, and greenish yellow in color. At the cut ends of the jejunum the mucosa is practically normal, but a section near the center of the loop shows marked thickening of the bowel wall, together with much narrowing. As shown in the illustration, the glands in the mesentery are considerably enlarged. The ends of the bowel which were held by forceps were closed and a lateral anastomosis was then made. This was a rather difficult procedure on account of the shortness of the remaining portion of the jejunum.

Within a few hours after operation the child was carried out on the veranda and there she remained throughout her sojourn in the hospital. She steadily improved and had no abdominal complications whatsoever. About two weeks after operation a partial facial paralysis was noted on the left side, but this did not interfere with her recovery.

Path. Nos. 20,246 and 20,287. Sections through the wall of the sac show that the outer surface is composed of fibrous tissue poor in nuclei. In some places it has a laminated arrangement. At other points the fibers run in all directions. There is a good deal of hyaline transformation. As one approaches the inner surface there is a tremendous amount of small round-cell infiltration and the tissue at certain points looks like ordinary granulation tissue, having a very abundant blood supply. Where this granulation tissue exists, the inner surface of the sac is covered with fibrin, which has in its meshes small round cells and polymorphonuclear leucocytes. At other points scattered through the granulation tissue are giant cells. Some of these resemble tremendous placques of protoplasm with rather deeply staining nuclei scattered throughout it. At other points are round or oval areas of protoplasm with oval or vesicular nuclei arranged chiefly around the margin of the large cell. At other points are tremendous giant cells surrounded by

small round cells or separated from the round cells by a zone of epithelioid cells. In other words, the picture is that of typical tuberculosis. In some places ten to fifteen giant cells are visible in one field. This is without doubt a tuberculous cyst of the mesentery of the jejunum. Sections from the growth in the small bowel failed to show any evidence whatsoever of tuberculosis.

In four or five weeks the patient was walking well and was going from her home to the Johns Hopkins Hospital to receive electrical treatment for the facial paralysis. She came to see me at the office shortly before the summer vacation.

Dr. Goldberg tells me that during the summer her appetite was good and that she gained four pounds. Suddenly, about two months after the operation, she was taken with severe headache, which at first was occipital, but which later extended all over the head. On the next day, when Dr. Goldberg saw her, she was in a semi-comatose condition, was irritable and cross and wished to be let alone. The light seemed to hurt her eyes and she did not care for food and water. The pupils were dilated and gave little or no reaction to light. The respirations were rapid, the pulse was quick, the temperature 99.4°. The heart and lungs were normal, the abdomen was scaphoid. The child lay with her limbs flexed and with her face away from the light.

She remained in this condition for several days. She was obstinately constipated. After the bowels had been emptied she showed some improvement for a few hours, but soon lapsed into her former condition. Some difficulty was noted in swallowing. This gradually increased and during the last two days the child refused all nourishment. Finally she became comatose and died. Three days before death partial opisthotonos was noted. There was backward traction of the head, but the knees were not drawn up.

Dr. Goldberg was unable to get an autopsy, but the clinical picture, coupled with the abdominal findings at operation, strongly suggested tuberculous meningitis as the cause of death. A tuberculous condition of the meninges is little to be wondered at when we remember the massive primary focus of tuberculosis in the mesenteric cyst.

POINTS IN THE SURGICAL TREATMENT OF ACUTE INTESTINAL OBSTRUCTION[1]

By SAMUEL J. MIXTER, M.D., Boston

IN 1912 Dr. McGlannan read before this society a most thorough and interesting paper on "Intestinal Obstruction." The discussion of the paper occupies in the proceedings much more space than the paper itself, although the subject of the use of eserin occupies an undue amount of space. At the same time, I feel that the last word has not been said on the surgical treatment of acute obstruction, and it is to emphasize a few of the important points that I venture to present this paper, which is suggested by a study of a very considerable number of acute intestinal obstructions occurring in our private practice within the last five years. These cases are forty-two in number and do not include any cases of chronic obstruction from whatever cause. They are as follows: Cancer in the large intestine, 22; adhesions, 12; megacolon, 2; gall-stone ileus, 3; omphalomesenteric band, 3.

Just a word on the indications for operation. Whenever it seems *probable* that the bowel is mechanically obstructed, the abdomen should be opened at once. It should always be remembered that the symptoms come earlier in obstruction of the small intestine than in the large and that less time is needed for severe lesions of the bowel in the upper part of the intestinal tract. One point that was emphasized in the discussion referred to, was the necessity of emptying the bowel above the constriction in cases where there was considerable or great distention. In late cases where there is danger of paralysis of the muscular coat or where it is already present, this may be done by the use of a tube tied in for a period sufficiently long to insure the return of the intestine and its contents to a fairly normal state. In the large intestine, the opening may remain for practically an indefinite time without damage and the opening, if properly made, will generally close of its own accord. In the small intestine, however, a long-standing opening means starvation of the patient, a terrible irritation of the

[1] Read at the meeting of the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 15, 1914.

skin, and a difficult and dangerous surgical procedure for its relief. Some method should be devised in these cases that will make the reëstablishment of the canal simple and under the control of the operator. In several cases I have been able to do this by stitching the walls of the small intestine together for three or four inches, thus making a sort of double-barreled gun with its opening on the surface. A pair of clamps, applied later in the old-fashioned manner of cutting the spur, is safe and generally is sufficient for the free passage of the fæcal stream and the spontaneous closure of the external opening. If properly done, this procedure is a practically safe one although it may be said that it is in a way working in the dark. If the external opening does not entirely close, the bowel is able to pass along most of its contents and a comparatively slight and safe operation completes the cure. The higher up the obstruction, the more dangerous is the artificial anus while the risk of auto-intoxication from an immediate reëstablishment of the fæcal flow is less. Even an extensive resection and immediate *anastomosis* may be done with less danger than in the lower gut.

It is in the cases of obstruction in the small intestine, caused by dense inflammation, adhesions, or knots which are not infrequent, that lateral anastomosis, sidetracking the obstruction, gives a most satisfactory and brilliant result. The operation is not always an easy one, for the intestine above with its long-standing obstruction is often enormously hypertrophied, sometimes with walls as thick as sole leather and the size of the forearm, while the intestine below to which it must be united may be no larger than the little finger. In spite of the difficulties, however, success is almost certain even where acute symptoms have been present for some days. I have had a considerable number of these cases and they have all recovered promptly and remained well for years.

For some reason that I never could understand, even the large tube tied into the large intestine will not always work and the distention will persist. The intestinal tract unfortunately is not a stiff tube with regular coils; and though the surgeon may be a good "plumber," he will occasionally fail on account of the nature of the tube on which he is working.

Obstructions that are near the cæcum are, to my mind, most difficult to manage. The obstructed small intestine must be given an outlet. For reasons stated above, an enterostomy opening in the small intestine is unpleasant and troublesome, complicating the subsequent operation for radical cure on the affected portion of the bowel. A sidetracking operation by lateral anastomosis between the ileum and the sigmoid, or some other convenient part of the large intestine, is most useful in fairly early cases, but even here the immediate result is not always as good as an enterostomy, and where there is much distention it is often found on reopening the abdomen that many troublesome adhesions have formed which may make a radical operation difficult. I have observed this condition in a number of cases where distention had been the factor, whereas, if there has been but a little distention, these adhesions have not been present. Whenever obstruction in the large intestine is well away from the cæcum a cæcostomy is the surest method of relief and gives the least trouble in a subsequent operation.

And now in regard to the method of approaching the obstructed bowel. One of the greatest advances in the treatment of this most serious condition is the use of spinal anæsthesia. Although a simple enterostomy may be done and should be done with infiltration anæsthesia, this does not, as a rule, admit of a thorough enough examination of the intestinal tract and location and examination of the point of obstruction. Chloroform, ether, gas and oxygen, unless given to a point of complete relaxation, do not permit the examination of the abdominal contents without undue violence. We have all seen intestines forced violently out of our incision, becoming congested and ecchymosed and even after they have been emptied and the operation completed, there is great difficulty in returning them to the abdominal cavity against the rigidly contracted abdominal muscles. With novocaine spinal anæsthesia, we have a method which gives

thorough relaxation. The shock is enormously less than with a general anæsthetic on account of the ease with which the intestines are handled, and the operation can be easily completed and the patient in bed before the anæsthesia wears off. It is well known that under spinal anæsthesia, and this is a most important point, the large intestine will often empty itself on the operating table through the relaxed sphincter and the surgeon and patient be saved a great deal of later trouble.

As soon as the abdomen is open, if the point of obstruction is not easily and immediately discovered, the distended loops should be emptied. After a trial of various methods, I have settled upon the trocar and purse-string suture as being the safest and most effectual. A number of such punctures may be made with slight loss of time, with little soiling of the peritoneum and no shock to the patient.

When I began the use of a stiff tube, or better a fairly stiff rubber tube, I felt that I had found the perfect method of getting rid of the intestinal "pea soup" and gas, but I soon found that the shock to the patient was out of all proportion to the advantage gained.

A method of emptying the large intestine that I have found most effectual in certain cases is the use of a long, preferably fenestrated rectal tube which is introduced by an assistant and, guided by the hand of the operator, may be easily passed even as far as the cæcum. The intestine having been partially emptied, it is possible by touch and inspection to find the point of obstruction and its nature, and the operation is completed before the spinal anæsthesia has worn off. In many cases the surest way to save life is by the establishment of permanent colostomy, but this should never be done unless the patient understands fully what the operation means. Personally, I am willing to take a very much larger risk of life in order to avoid this very unpleasant result. Many cases of artificial anus are so made that they can be fairly easily managed, but my personal feeling is that any risk of death is preferable. If an artificial anus should be made, remember that the umbilicus is the point which moves less with muscular action than any other point of the abdomen and the nearer the opening can be made to this point, the more readily can an adequate apparatus be fitted to the patient. A large loop of intestine should be brought out so that the abdominal wall can be stitched together through a hole in the mesentery and thus the two ends are later separated in such a way that the fæces in the upper end cannot enter the lower part of the bowel.

It should always be remembered that in the late cases more lives are lost by doing too much than too little. The emptying of the bowel and drainage of the intestine are two important factors in addition to speed.

Early operation is easy and comparatively safe. In late cases, the condition is a very fatal one and we shall always have a certain number of these desperate cases either from the objection of the patient to operation, the delay of the physician in charge, or our own mistake.

THE RADIUM TREATMENT OF FIBROID TUMORS[1]

By HOWARD A. KELLY, M.D., Baltimore

I HEREWITH present a series of thirty-six cases of fibroid tumors of the uterus treated by radium from March 18, 1913, up to October, 1914. I have excluded from this plan of treatment only cases which presented some serious complication such as pelvic inflammation, ovarian growths, or obstructive symptoms. This list refers only to patients treated in a private hospital in Baltimore.

The method of treatment employed has been a dilatation of the cervix and the introduction within the uterine cavity of amounts of radium varying from 30 to 724 mg. In some of the larger tumors an additional massive treatment has been given through the abdominal walls. I omit one case included in a former list, in which the treatment was applied within the cervix and not within the uterine cavity. In this case the symptoms of excessive flow continued, and I operated upon the patient, doing a supravaginal amputation. The effort has been made in each case to treat the uterus and the tumors, avoiding as far as possible treating the ovaries unless the patient was near the menopause or past it. Γ-ray therapy is applied, the radium being screened by platinum or platinum and glass, further enclosed in a rubber tube. In giving massive abdominal treatments, the radium is further enveloped in cotton and gauze in order to give distance to the treatment.

The patients have varied in age from thirty to sixty-seven years, the average being forty-two and one-half. Divided into three groups, eleven were between thirty and forty, twenty-one between forty and fifty, and four over fifty.

The tumors have varied in size from small ones about 5 cm. in diameter to massive growths extending close to, or well above, the umbilicus. The large tumors were more or less spherical.

The indication for the operation in a surprising number of cases was hæmorrhage, either menstrual, or both menstrual and intermenstrual. Occasionally the complaint was dysmenorrhœa and pain, or simply pain in the lower abdomen, or, again, the patient came because she recognized that she had a growing tumor.

Tumors of all kinds have been treated and the submucous and subperitoneal, and even the pedunculate, have seemed to respond as well as the interstitial. All the patients are under observation, being written to, or examined with the aid of the family physician, or seen and examined personally.

The results in every case but one have been either the shrinkage of the tumor or its complete disappearance. This latter happy terminus has not seemed to depend on the size of the growth, as, for instance, one in the list reached three finger-breadths above the umbilicus, one was just below the umbilicus, and another was 15 cm. in diameter. The desired results were secured in periods varying from two months to a year or a year and one-half. In some of the cases, still under observation some months after treatment, the shrinkage still continues. One of the most striking effects is upon the menstrual function, where the radium can in all cases be depended upon to bring about complete amenorrhœa. In the one case in the list which has recently been operated upon, and in which radiation failed, although the tumor did not shrink in size, complete amenorrhœa was secured. If care is taken to avoid giving too large a treatment, it is possible in some cases, especially with young women, to avoid amenorrhœa (four instances in list). With this object in view, a large treatment is given over a short period of time.

The amount of radium used has varied considerably, as we have been busy working out just the proper dosage. As an ideal dosage we would suggest ½ gram of radium element for two hours. We are at present working diligently, attempting to establish some other gauge of treatment than the

[1] Read before the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 15, 1914.

Initials	Date of Treatment	Age	Symptoms	Size Tumor	Treatment Radium Element	Results
E. R. W. San. 4572	18- 3-13	45	Hæmorrhages	Small fibroid	30 mg. 48 hours	Tumor disappeared; cessation menses.
E. G. E. 55	23- 3-13	35	Menorrhagia	Size of fist	3 in all, 30 mg. 48 hours	Cessation of menses. Growth ⅓ size.
M. K. 119	27- 5-13	46	Menorrhagia	3 months pregnant	50 mg. 24 hours	Complete disappearance of tumor; menstruation continues regular.
F. D. P. 175	17- 5-13	44	Menorrhagia and dysmenorrhœa	15 cm. spherical	70 mg. 24 hours	Amenorrhœa, uterus normal.
A. A. W. 274	22- 7-13	51	"Bleeding and tumor"	22 cm. across and with cyst 20 cm.	60 mg. 47 hours	Amenorrhœa, tumor reduced to one-half, ovarian tumor disappeared.
M. B. 281	25- 8-13	33	Profuse menstruation	Tumor filling pelvis three fingers above umbilicus	120 mg. 18 hours	Amenorrhœa, complete disappearance of tumor.
E. B. 324	4-10-13	43	Excessive bleeding	Uterus twice normal, one tumor felt	80 mg. 24 hours	Amenorrhœa, uterus normal, tumor gone.
M. M. 332	7-10-13	40	Bleeding tumor; exophthalmos	Up to umbilicus	Abdominal—734 mg. 6 hrs.; 484 mg. 4 hrs.	Amenorrhœa, general improvement, great reduction in size of tumor.
C. N. B. 333	7-10-13	43	Excessive menstruation	Half way to umbilicus, 15 cm. in diameter	60 mg. 24 hours, 300 mg. 20 hours—abdominal	Amenorrhœa, tumor reduced to two and one-half cm. pedunculate.
C. E. D. 334	20-10-13	40	"Tumor"	Filling pelvis up to umbilicus	100 mg. 26 hours, 60 mg. 11 hours—abdominal	Amenorrhœa, tumor size of orange.
H. W. T. 370	6-11-13	59	Irregular hæmorrhage and tumor	Four months pregnant	10 mg. 24 hours	Cessation of bleeding, reduction of size of tumor.
W. T. D. 375	10-12-13	33	Menstrual bleeding	Filling pelvis and abdomen above umbilicus	60 mg. 18½ hours	Amenorrhœa, tumor one-half size.
A. McG. 394	18-11-13	46	Bleeding	3 months pregnant	60 mg. 17½ hours 60 mg. 2 hours	Amenorrhœa, reduced to one-half size.
A. H. McF. 614	6- 2-14	46	Hæmorrhages	Uterus twice normal, a fibroid 4 cm. in diameter	170 mg. 13 hours	Amenorrhœa, normal size.
A. F. F. 637	22- 2-14	40	Excessive hæmorrhages	3 months pregnant	170 mg. 10 hours	Amenorrhœa, tumor disappeared.
B. S. 681	16- 3-14	39	Tumor	Just below umbilicus	544 mg. 1½ hours, 1371 mg. 2½ hours—abdominal	Complete disappearance of tumor, menstruation normal.
L. H. C. 771	20- 4-14	44	Excessive flow, tumor	5 months pregnant	724 mg. 1½ hours	Amenorrhœa, reduced to one-half size and still going down.
M. L. C. 792	25- 4-14	49	Tumor. Past menopause	15 cm. diameter	275 mg. 6 hours	Reduced to 8 cm.
A. L. 825	30- 4-14	38	Excessive flow, dysmenorrhœa	6 weeks pregnant	560 mg. 3 hours	Amenorrhœa, disappearance of tumor.
A. H. 931	14- 6-14	45	Bleeding	2 months pregnant	380 mg. 4 hours	Amenorrhœa, reduction of tumor.
A. W. 932	23- 6-14	67	Tumor	Filling pelvis and lower abdomen, 10 cm. across	300 mg. 2¼ hours	Reduced to one-half size.
D. G. 933	22- 6-14	46	Tumor	4 months pregnant	544 mg. 6 hours	Amenorrhœa, marked reduction in tumor.
J. H. B. 940	26- 6-14	40	"Terrible bleeding"	4 cm. above pelvis	300 mg. 3 hours	Complete amenorrhœa and disappearance of tumor.
F. E. B. 969	3- 7-14	45	Tumor and abdominal pain	Filling pelvis up to umbilicus	544 mg. 4¼ hours 1911 mg. 8 hours—abdominal	Amenorrhœa, tumor size of orange wholly intrapelvic.
G. B. B. 991	20- 7-14	44	Tumor and dysmenorrhœa	8 cm. above pubis	400 mg. 4 hours	Amenorrhœa, great reduction in tumor.
E. P. M. 964	2- 7-14	42	Tumor and pain	10 cm.	544 mg. 3½ hours	Amenorrhœa, reduced to 5 cm. diameter.
E. I. K. 978	11- 7-14	37	Excessive painful menstruation	Twice normal, tumor big as hen's egg	544 mg. 3½ hours	Amenorrhœa, tumor one-half diameter.
E. S. T. 994	18- 7-14	38	Bleeding and tumor	Just below umbilicus filling pelvis	544 mg. 4¼ hours 1911 mg. 4 hours—abdominal	Menstruation normal, tumor one-fourth original size.
T. J. H. 1003	28- 7-14	38	"Fibroid tumor"	15 cm. diameter	510 mg. 4 hours	Amenorrhœa, reduced to one-half, still going down.
G. D. B. 1059	9- 8-14	30	Abdominal pain, tumor, bleeding	Filling pelvis and lower abdomen to umbilicus	300 mg. 6 hours	Tumor intrapelvic, menstruation regular and scant.
I. S. Mc. 1072	21- 8-14	38	Tumor	Entire pelvis, abdomen to two fingers above umbilicus	510 mg. 3 hours 1911 mg. 15 hours—abdominal	Menstruation persists, greatly reduced, intrapelvic.
J. S. B. 1121	9- 9-14	43	Tumor	Reaches within 3 cm. umbilicus; 9 cm. across	540 mg. 4 hours 1911 mg. 2 hours—abdominal	Reduced in size to 8 x 9 cm.
M. E. T. 1150	23- 9-14	38	Tumor, hæmorrhage	9 cm. in diameter, fills pelvis half way to umbilicus	647 mg. 4 hours and 3 minutes	Menstruation regular, tumor two-thirds original size.
M. M. 1160	5-10-14	43	Tumor, hæmorrhage	Filling pelvis to umbilicus	400 mg. 4 hours	No bleeding, tumor intrapelvic about 8 cm. in diameter.
M. S. 1207	30- 7-14	45	Excessive bleeding and tumor	3½ months pregnant	714 mg. 4 hours	Amenorrhœa, uterus normal in size.
M. C. 1022	2- 8-14	36	Aortic regurgitation, tumor, excessive bleeding	Tumor above umbilicus	510 mg. 5 hours 1911 mg. 7 hours—abdominal	Menstruation stopped, tumor unchanged, operation.

radium hours, that is to say, estimating that 100 mg. inserted for four hours is to be called a 400 mg. hour treatment and equal to a dosage of say 25 mg. for 16 hours which also makes a total of 400 hours. The physiological and pathological effects are by no means the same.

The present obvious factors are: the size of the tumor, the position of the ovaries, the amount of radium used, the distance of the radium from the tumor and the ovaries, and the time over which treatment is continued.

The sensitiveness of the tumors to radiation varies extremely, some of them responding almost like round-celled sarcomata, shriveling away rapidly. As yet no real dangers have developed in connection with the treatment, and with the methods more recently in use, viz., that of a big dosage and a short exposure, the discomforts are very slight, or none at all. While on the other hand with a small dosage and long exposure, abdominal discomforts were sometimes produced lasting several weeks, with a leucorrhœa more or less persistent. In about 50 per cent of the cases where amenorrhœa has been produced, there have been no hot flushings or nervous symptoms, although these menopausal sequelæ have been marked in some cases.

The best answer to the question regarding the liability of overlooking malignancy in some of these radium treated fibroids is taken from Krönig and Gauss' statistics of several hundred fibroid-tumor cases treated with X-ray where not one developed any malignant disease subsequently.

The radium treatment is ideally adapted to anæmic and weak patients.

I fully realize that in presenting so short a series the results are suggestive rather than conclusive, and that further experience is necessary before we can speak with confidence as to the outcome in any given case. I suggest, therefore, the following tentative conclusions:

1. Massive radium treatment of uncomplicated fibroid tumors is the best plan, as it stops the excessive flow; sometimes in younger women it regulates it without stopping it. Radium reduces the tumors in almost every instance, relieves pressure symptoms, and even causes large tumors to disappear.

2. A fibroid tumor is not a malignant growth; therefore any method of treatment which will give entire relief to the symptoms is the best method, provided it will at the same time avoid the various risks of an operation. If radium is tried and fails, the operation can then be undertaken without any added risk. Touching this last point, I must add that while a recent radium treatment often makes more difficult the subsequent radical extirpation of a cancer of the cervix, there is no reason to expect this result in fibroid tumors.

3. It is our belief that with increased experience and improved technique, it will be possible to relieve every patient of hæmorrhages, and in most instances to do away with the tumor (let us say, roughly speaking, in 9 cases out of 10), and that without serious discomfort, risk, or confinement to bed for more than one or two days. Patients too anæmic and weak even for an intra-uterine application of radium can be treated through the abdomen exclusively.

CANCER OF THE PROSTATE[1]

By E. S. JUDD, M.D., Rochester, Minnesota
From The Mayo Clinic

IT is difficult to estimate the frequency of the occurrence of cancer in the prostate from operative records, since the cancerous tumor in this gland is often very small and may not produce local symptoms. Moreover, in many instances, the metastatic lesion is discovered before the primary focus. It is generally reported, however, that one case in five (20 per cent) of prostatic enlargement causing obstruction in old men is due to cancer. The records from our clinic will bear out this percentage.

There have been 878 prostatectomies performed in the Mayo clinic up to the present time, December 1, 1914. In 93 of these, cancer was found. In addition to these (from January 1, 1910, to December 1, 1914), 84 cases were diagnosed cancer but were not operated on because they were too advanced for any operative procedure or because the chances for cure were not good enough to warrant interference in individuals who were fairly comfortable.

A similar ratio of occurrence is found in the autopsy records. Kümmell (1) reports that in 38,472 autopsies there were 204 diseased prostates, 43 or 21 per cent of which were carcinomatous, while Gebele (2) in a report on the material at the Pathologic Institute of Munich says that 38 per cent or more than one in three cases of prostatic lesions were cancerous.

Age of the patient. In our series of 93 cases operated on, the youngest patient was fifty-one years of age and the oldest eighty-two.

Number between 50 and 60 years	21
Number between 60 and 70 years	34
Number between 70 and 80 years	36
Number between 80 and 90 years	2

In our series of non-operated cases there were a few patients just under fifty years of age but the cancer was too far advanced for operation. The age incidence gives no suggestion as to the nature of the trouble, since it corresponds very closely to that of benign hypertrophy.

Symptoms. In many cases the symptoms do not differentiate early cancer from adenomatous hypertrophy. The pain associated with cancer is usually much more marked in the region of the prostate. It is more constant and is not necessarily associated with micturition. This localized pain is supposed to be due to tension within the capsule. It becomes more marked locally and as the disease progresses also radiates into the extremities and to the back. Pain of this character does not occur in other lesions of the prostate and is somewhat characteristic of cancer.

There is a marked variation in the *duration* of symptoms. A gradual onset, growing steadily and rapidly worse without attacks of acute retention, would seem to favor malignancy. The onset and length of time of symptoms may be identical with the ordinary case of benign hypertrophy. Nine of our patients had had symptoms only six months; while eight had been troubled more than ten years, two of these more than fourteen years. More than half of the patients had had trouble between one and four years. In all probability in patients having symptoms for a number of years the early symptoms are due to hypertrophy which often occurs at the same time.

DURATION OF SYMPTOMS

6 months or under	9 cases
6 months to 1 year	2 cases
1 year to 2 years	20 cases
2 years to 3 years	14 cases
3 years to 4 years	10 cases
4 years to 5 years	7 cases
5 years to 6 years	9 cases
6 years to 7 years	5 cases
7 years to 8 years	3 cases
8 years to 9 years	4 cases
10 years	5 cases
12 years	1 case
14 years	2 cases

Frequency of urination was one of the most prominent symptoms and usually the first to appear. In many cases frequency and difficulty were noted at about the same time.

[1] Read before the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 15–17, 1914.

The frequency was usually first noticed at night. I believe this symptom becomes most marked in cancer involving the entire prostate. A number of our patients voided every few minutes. Difficulty in urination in cases of cancer is not as prominent a symptom as in the cases of benign hypertrophy. It was present, however, in all but 14 of the 93 patients. In 3 there had been complete retention and a suprapubic stab drain had been made previous to their coming to our clinic for examination. One patient had suprapubic drainage made two years before coming for operation and had passed no urine through the urethra during that time. Only two of our patients complained of dribbling. Dribbling was more common in the cases of benign hypertrophy.

Blood in the urine. Hæmaturia was present in 21.9 per cent of the cases. One patient had noted blood in the urine every day since the symptoms began, three years previous. In most of the cases the amount of blood was small and noted only occasionally; it was a comparatively late symptom, being noted at most only a few months before the patient came for examination. In none of the malignant cases was there a sharp hæmorrhage and the passing of clots which occasionally occurs in benign hypertrophies. Bleeding did not occur in any of our early cases.

Forty-nine of our patients had used a catheter; nineteen had used it for one month or less. In several instances it had been used only once or twice. Three patients had been using a catheter for about one year, one for two years, one for four and one-half years and one for seven and one-half years. One had had permanent suprapubic drainage for two months and one for three months.

It has been interesting to note but difficult to explain that in our cancer cases, as a group, the specific gravity of the urine has been unusually low, in many instances ranging from 1,002 to 1,005 in individuals generally in good health.

Aside from the character of the pain, which in cancer is apt to be constant and independent of micturition, the symptomatology of cancer in the early stages is almost identical with that of benign hypertrophy and the physical examination may reveal the first signs of malignancy.

Physical findings. A general physical examination usually shows a healthy robust individual. Rectal examination may reveal a small prostatic gland, or, if hypertrophy is associated with the cancer, the enlargement may be quite marked. If on palpation the surface of the prostate is rough with hard nodules, it is always suspicious since in the benign cases the prostates are nearly always smooth unless there is associated inflammation or calcareous deposits in the substance of the gland. In benign cases they are often lobulated though their surfaces are smooth. In cancer, if the surface is smooth, the prostate is very hard.

It is sometimes impossible to discover malignancy when it is associated with hypertrophy or to distinguish malignancy from chronic inflammatory prostatitis. In six of our cases the gland was soft, due to the fact that adenomatous hypertrophy predominated and the cancer was not felt. In many of our cases a hard nodule could be felt in one lobe while the other showed no changes.

The characteristic cystoscopic picture is a small prostatic bar unless adenomatous hypertrophy exists at the same time. The mucous membrane of the urethra or bladder is not ulcerated except in the late cases. Cystoscopic examination is of great aid, especially in ruling out those cases too advanced for operation. However, this examination should not be made in evidently hopeless cases since the reaction following may be quite severe.

The chief factor in the clinical diagnosis of cancer of the prostate, whether or not it be associated with other conditions, is an irregular, hard "feel" to the surface of one or more lobes of the gland. The type of pain may be suggestive, but is not diagnostic.

A study of our specimens removed at operation showed that in about 75 per cent the cancer was associated with hypertrophy, and in the remaining 25 per cent the cancer occurred in prostates in which we were not able to find evidence of hypertrophy. In the group of cases associated with hypertrophy, the symptoms and findings were often those characteristic of benign hypertrophy and in several

instances the cancer was not discovered until the specimen had been carefully sectioned. In these cases the malignant process apparently always started in the posterior lobe and often was distinctly separated from the rest of the gland, which was not involved. The tumor produced by benign hypertrophy in some of these cases is quite as readily enucleated as in the ordinary case, and unless the posterior segment is enlarged the malignant process may easily be overlooked. This error has occurred once in our experience. A large bilateral and median hypertrophy was removed in the ordinary way. At the time of the patient's death, a few weeks later, the wounds were healed and the functional results were good, considering the short time that had elapsed. At autopsy a small hard cancer entirely capsulated was found in the posterior lobe. I believe that the cancer in this case had nothing to do with the fact that the patient did not live longer, but the experience served as a good lesson, and since that time, in every supposedly benign case, after removing the hypertrophied lobes, the remaining posterior lobe and posterior part of the capsule is carefully palpated for any evidence of hard and irregular nodules. If the hypertrophied part is more firmly attached posteriorly or shells out with difficulty, there is always suspicion of cancer. If the cancer alone exists in the prostate, it is usually easier to distinguish. The tumor is small and hard and seems to involve the entire gland. In such cases the patients have considerable constant pain not associated with urination unless there is tendency to stricture, a condition which is not uncommon. The growth does not often extend into the bladder so that from a suprapubic exposure the bladder may appear quite normal. If an effort is made to pass a finger down into the prostatic urethra, a firm hard rim is felt, and if we try to remove this rim it is found to infiltrate into all the surrounding structures and cannot be removed except in small pieces. These cases are the least favorable for operation. Often in the apparently early cases the malignancy extends beneath the trigone into the seminal vesicles and as high as the ureteral orifices.

Treatment. Radical operations for this condition have gained favor very slowly, not because it is impossible to remove the growth with a reasonable degree of mortality, but largely because it is impossible to do a thorough radical removal of the cancerous prostate and the adjoining part of the bladder without completely destroying the mechanism of urinary control. We must also consider the fact that the conservative prostatectomy may cure a certain percentage of the early cases and at the same time give satisfactory functional results. Before undertaking the radical operation, the patient should understand that he will have no control of his urine. We see very few people who are at all comfortable with a total incontinence of urine.

Patients who are incurable but fairly comfortable either with or without the catheter should not be operated on, though certain of these who have not used catheters should be advised to do so since they may be made more comfortable by its use. When the patient's symptoms are extreme or the use of the catheter causes great pain, even if the prospects for complete cure are not good, they should have a palliative operation. In many of the cases the obstruction to urination is due to a benign hypertrophy. Removing the obstruction and also a part of the cancer will entirely relieve patients for a time and they will be much more comfortable than with any other procedure.

The mortality under these circumstances is little more than in the benign cases; the functional result is quite as good; usually the wounds heal just as promptly and the pain is entirely relieved. Many of these patients live several years in comfort. Kümmell states that these patients receive benefit from X-ray and radium.

End-results. Through correspondence and personal communication we have been able to trace 82 of the 93 patients operated on. In all of these an ordinary prostatectomy was done, either by the suprapubic or perineal method. Of these—

8 lived more than 3 years.
12 lived more than 2 years.
13 lived more than 1 year.
24 died within the first 6 months.
5 died, time unknown.

Patients still living after 6 months	3
Patients still living after 1 year	7
Patients still living after 2 years	4
Patients still living after 3 years	3
Patients still living after 4 years	2
Patients still living after 9 years	1

The patient who is living and free from symptoms nine years after the operation had a very small cancerous nodule removed. Many of the patients living at the present time are entirely free from symptoms. Three who were operated on within the year, yet more than six months ago, are well. In the cases of recurrence, hæmaturia was one of the first evidences of the recurrence. Difficulty of urination was also an early symptom and became rapidly marked, necessitating suprapubic cystotomy in a number of cases. Several patients lived more than three years without evidence of trouble when there was a return of all of their symptoms.

REFERENCES

1. KÜMMELL, H. Die Diagnose und Behandlung der bösartigen Prostataerkrankungen im Anfangsstadium. Ztschr. f. urol. Chir., Berl., Oct. 11, 1913, ii, 18.
2. GEBELE. Über das Prostatacarcinom. Beitr. z. klin. Chir., 1913, lxxxiii, 657.

THE WISDOM OF THE PAST, A PROPHECY OF THE FUTURE[1]

BY JOHN WESLEY LONG, M.D., F.A.C.S., GREENSBORO, NORTH CAROLINA

THE coming of the Southern Surgical and Gynecological Association into the old North State marks an epoch in the history of both state and Association. For the state I will say we appreciate your coming into our midst. With the exception of the Charleston meeting, twenty years ago, when the lamented Cornelius Kollock was president, this is the only time the Association has ever gone to the state from which it chose its presiding officer. Therefore I may add a personal note of gratification.

Your well-nourished features and elegant apparel do not indicate that you have been feeding upon husks; nevertheless, we have killed the fatted calf and brought forth the wedding robe and ring, indicating thereby that, having come once, we shall always claim you as our own, and want you to feel that we are yours.

This meeting shall, we trust, not soon be forgotten by the Association. Be it known unto you, friends, that you stand upon soil made sacred by every token that appeals to one's patriotism, love of home, and native land. For instance, to have been one of the original thirteen colonies is no mean distinction. Without invidious comparison, suppose one could have the choice as to where he should be born, do you imagine he would hesitate for a moment to choose a state whose sons unsheathed the sword to gain their independence, who defied royal tryanny, even though it be called "treason," rather than a state, however great, whose star has been added to Old Glory, like a belated afterthought?

Glancing back as far as the Revolution, we find a number of important engagements were fought in North Carolina; and the decisive blow that sent Lord Cornwallis reeling on to Yorktown, where he surrendered to Washington, was struck by General Nathaniel Greene at the battle of Guilford Court House, near the center of the state.

Passing rapidly to the period of our Civil War, which some of you remember and a few saw service in, if you will pardon a personal reference, I may say that I was born amidst the mutterings of the ominous war-cloud which burst into that most fearful internecine conflict the world had ever seen. Into that holocaust North Carolina sent more men, and boys, than she had voters, over forty thousand of whom never came back. Notwithstanding the gruesome price she paid, it shall ever be the proud boast of the old North State that "she was first at Bethel,

[1] Presidential address before the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 15, 1914.

farthest at Gettysburg and last at Appomattox." Into the history of her soldier heroes the state has written the legend inscribed upon the stones over the Spartan dead who died at Thermopolæ: "Stranger, go tell in Lacedeman that we lie here in obedience to her command."

But it is not of deeds of valor or exploits of war that North Carolina would boast. Rather would she be known for her victories of peace. In common with the other southern states, the war left her impoverished beyond description, robbed of civil liberty, her property confiscated, her fair land despoiled, her slaves sitting in legislative halls. Surely she was cast down, but not destroyed. Then it was her valiant sons arose in their might and disfranchised the ignorant, the incompetent, the vicious, the impossibles, and reënfranchised the true citizenship of the state. This act has stood the test of the Supreme Court of the land.

While North Carolina is distinctive in many ways, she is but a type of the South. Undisturbed to any great extent by the flotsam and jetsam of other lands, the South developed and retained customs, conditions, conventionalities, convictions, all her own. It would be interesting to study these characteristics, but it would lead us too far afield. We are concerned in this connection only with the southern surgeon.

Those of you who live in the large cities of the North and West cannot appreciate the disadvantages under which the southern surgeon labored. If this were true in antebellum days, it was a hundredfold more so following the war. Isolated, limited in clinical and laboratory facilities, practically denied membership in the national special societies, his mental development hindered because of lack of opportunity, the old time southern physician was thrown back upon his own resources. No one questions his native ability, environment constituted the shackles that clogged his feet. His was the task to overcome obstacles. Often he had to make brick without straw. But he remembered the axe over the old Norseman's door and the slogan to "find a way or make one." He made one, yea many, one of which leads to this glad hour and occasion; and in the making he laid the foundation so broad and deep that those who follow may find safe and easy footing.

Even a superficial knowledge of the southern surgeon convinces one that he possessed superb qualities, and his history is illuminated with evidences of his ability to do great things. Despite the limitations of environment, he encompassed herculean tasks. Many brilliant examples are well known where he burst the bonds that would have circumscribed a weaker man, performing exploits that make him the envy of the world. A perspective reveals him unearthing great discoveries, doing unprecedented operations, formulating undying principles, daring to do deeds of heroism!

However, let it be distinctly understood that we make no claim to superiority of either blood or brawn or brain. We would draw no disparaging distinctions. Rather do we rejoice with exceeding great joy in the ability and success of every member of our profession under the stars and stripes, in fact throughout the world. But as a faithful messenger, as one who under the providence of God has been spared to tell the tale, I must give credit to my compatriots who deserve it; whose lives stand out as beacon lights along the pathway of history; whose works have mitigated pain, alleviated disease, and added years to the life of womankind, and that of man as well.

If we may judge by what they accomplished, many of these men were so far in advance of their times as to appear to have possessed the knowledge of prescience. As is well known, the gift of prescience was granted to the prophets of old, but in a material sense was by no means confined to them. One of the books that enthralled my boyhood days was Jules Verne's *Twenty Thousand Leagues Under the Sea*, written several years (1869) before Holland planned his first submarine (1875).

Sometimes the poet[1] gets a glimpse of the deeper things of life, his vivid imagination giving him visions denied ordinary mortals, enabling him to foretell that which later becomes clear to us all. The inimitable Shake-

[1] *What Can Literature Do for Me.* C. Alphonso Smith.

speare, eighty-three years (1602) before Newton announced the law of gravitation (1685), makes Cressida to say:

> But the strong base and building of my love
> Is as the very center of the earth,
> Drawing all things to it.

Listen to Tennyson in Locksley Hall, written in 1842:

> For I dipped into the future, far as human eye could see,
> Saw the Vision of the world, and all the wonder that would be;
>
> Saw the heavens fill with commerce, argosies of magic sails,
> Pilots of the purple twilight, dropping down with costly bales;
>
> Heard the heavens fill with shouting, and there rain'd a ghastly dew
> From the nations' airy navies grappling in the central blue;
>
> Far along the world-wide whisper of the south-wind rushing warm,
> With the standards of the peoples plunging thro' the thunder-storm;
>
> Till the war-drum throbb'd no longer, and the battle-flags were furl'd
> In the Parliament of man, the Federation of the world.

Such writers may be said to have walked in the twilight zone of prophesies which are now being rapidly fulfilled. Sir Humphry Davy walked in the twilight zone of nitrous oxide anæsthesia in 1800. Forty-four years later the Hartford dentist, Wells, made practical application of this knowledge. Faraday walked in the twilight zone of ether anæsthesia in 1818, but not one of those who came after him stepped into the brilliant light of applied science till, in March, 1842, Crawford W. Long of Jefferson, Georgia, anæsthetized James Venable with sulphuric ether and excised a cyst from his neck.

Without question many men must have walked in the twilight zone of ovariotomy. But it remained for McDowell, the Kentucky village surgeon, in 1809, to remove a sixty-pound cyst from Mrs. Crawford, without anæsthesia, in his office, while the mob on the outside howled for his blood, to dispel the twilight of surgical impossibility and place another star in the firmament of professional achievement!

Look at Sims, born and educated in South Carolina and practising medicine at an Alabama cross-roads. He is now, and always will be, justly called the "father of modern gynecology." Note his despondency in his early years; see him tear down his tin sign and throw it into the well in the back yard. Observe him sell out his little belongings, and try to go into the clothing business. Think of it! J. Marion Sims selling "clodings!" Picture in your mind his first operation on Anarcha, using a bent spoon handle for a speculum. He fails, but he tries again and again, till twelve times he has failed. Oh, what a moving picture that would make! But look once more; he's walking down the street.[1] His eye chances to light upon a tiny spiral, lost, perhaps, from an old suspender. Inspiration seizes him. The scales fall from his eyes. He no longers walks in the twilight of failure. He sees clearly. If he only had a *silver* wire as fine as that bit of brass spring he could cure Anarcha's vesicovaginal fistula. He has it; he succeeds! Eureka! See; this gavel made from a leg of Sim's operating table bears mute testimony to the greatness of its illustrious master!

The twilight zone! It's only the old, old story of genius groping in the dark for the unknown. It's the gift of prescience in the awakening! Tyndall said: "The greatest discoveries of science have been made when man has left the region of the seen and known and followed the imagination by new paths to regions before unseen."

Varro, in 127 B. C., clearly taught that infectious diseases were caused by microorganisms. Two centuries before Koch became famous through his brilliant researches in bacteriology, A. von Leeuwenhock, of Delft, looking through a simple lens of short focus discovered bacteria. It was no fault of the Dutch scientist that the world was slow to appreciate his unrivaled contribution to science.

The profession gives credit to him who gets there first. The first anæsthesia; the first ovariotomy; the first cure of vesicovaginal fistula; the first hip-joint amputation in America done by Brashear of Kentucky, in 1806; the first removal of half of the lower jaw by Deadrick of Tennessee, in 1810; the first total removal of the clavicle done by

[1] This picture of Sims is true to history. See *Sims and His Work*, by Wyeth, *Trans. Southern Surg. & Gynec. Ass.*, viii, 9.

McCreary of Kentucky, in 1813; the first successful ligation of the innominate artery by Smythe of New Orleans, in 1864, *et al.*

But I must hasten on. Moreover, priority is by no means the only claim the southern surgeon has upon our appreciative memory. The limits of this address forbid anything more than the barest mention of a very few of the men whose services in time of war and peace have forever endeared them to our people. There is Paul F. Eve, famous in the Polish War and our own Civil War, and no less great as a teacher of surgery. Twice was he called to the University of New York, once to succeed Valentine Mott. Mattauer of Virginia did seventy-nine lithotomies with only four deaths (5 per cent). Briggs, one of our founders, and an incomparable teacher of surgery, four times called to other schools, did two hundred and seventy-four lithotomies with only eleven deaths (4.7 per cent). Dudley of Kentucky did two hundred and twenty-five with three deaths (1.33 per cent). Winslow of North Carolina did ninety-nine with one death (1 per cent). All this and infinitely more before the days of aseptic surgery and some of it prior to anæsthesia. Yandell, another of our Fellows, was a surgeon of unusual ability and distinction. Robert Batty's name deserves to go down with the world's celebrities.

I said there were heroes among southern physicians. Two instances only must suffice. When I was a student in Vanderbilt University, Professor Thomas Menees would each year bring his grandson, four or five years old, to the lecture hall, stand the little fellow upon the speaker's desk, and with tears in his eyes tell the story of his son, the boy's father, laying down his life in his efforts to rescue the yellow fever sufferers in Memphis in 1876. T. O. Summers, who went with young Menees, was spared to become one of our founders. McGuire tells us of kneeling beside a southern surgeon at Cold Harbor whose side had been torn away by a shell. When told that his wound was mortal, the dying man replied, "I am no more afraid to die than I was to do my duty."

But why prolong this list? The task is too great. I could not even call the roster of the illustrious dead of the South, though we omit the names of such men as Thomas and a multitude of other Southerners, who went North or elsewhere and became leaders in their profession.

Like the independence of the Colonies, the redemption of the South, the achievements of our predecessors, and many other good things that we enjoy, the Southern Surgical and Gynecological Association was born of the exigencies of the times. Dr. Haggard, our first president, said in his address (1888), "It did not spring voluntarily into existence, but was the outgrowth of necessity."

As is true of most mortals, especially those who start with large cranial development, its natal day was not consummated without much pain and labor; but since "joy cometh in the morning when a man child is born," let us forget all the unpleasant features in our rejoicing over present realizations and future possibilities.

As I read the history of books and men, the formation of this Association was due in part to the desire in the hearts of certain young "progressives" for better things, and in part to the wise counsel of older heads. The organization was hastened in no small degree and crystallized by the very antagonism which the movement engendered. It is of these men and movement that I wish briefly to speak.

It was my good fortune to have been a classmate of William Elias B. Davis in the Medical Department of Vanderbilt University and the University of Nashville. I have many reasons for remembering young Davis in those early years, one being that I had the temerity, in common with a number of other reckless youths, to contend with him for the distinction of being valedictorian of our class. The test was a speech delivered by each contestant before a meeting of the student body, under the supervision of a member of the faculty. It is only just to those ambitious young medicos, my competitors, to say "there were orators in those days." The speeches over, noses were counted, and amid much acclaim Davis was declared elected to deliver the valedictory. That Davis later became distinguished; that

he developed remarkable ability as a surgeon, as an organizer, as a writer, as an experimenter, as a leader among men; that he became famous before he was forty years old was no surprise, I am sure, to those who knew him in his college days.

Another man who made a deep and lasting impression upon me in the halcyon days of the long ago, as upon all with whom he came in contact, was the late W. D. Haggard, Sr., M.D., father of our distinguished secretary. Incidentally, allow me to say, the difference in the teaching of medicine under the old régime and the new is strikingly shown by the fact that the first lecture I heard (1800) as a medical student was by Doctor Haggard, Sr., and the subject was "the treatment of secondary post-partum hæmorrhage." As a teacher Dr. Haggard was clear cut, exact, honest. He was far-reaching in his knowledge of men and things. He was an arduous student always. His devotion to medicine and surgery, his enthusiasm, were catching. To the young men he was a safe and wise counsellor. To come in contact with him was like steel approaching a powerful magnet; his influence was irresistible. When the Davises, and Dixie Douglas, and John Wesley Gaines, for many years now a member of Congress, and W. H. Park, who, I understand, is the most influential white man in China today and upon whom the government recently conferred the Loh Tung Chia Ho Tsang, or the Golden Grain decoration of the sixth order, and many others, including your humble servant, sat beneath the spell of Haggard's teaching, he was already approaching the chloroform age. His was one of the most striking examples of a man in advanced years who was ever on the alert to learn all that was new and best in his profession.

I have it at first hand that the movement which culminated in the present organization was first called the Alabama Surgical Association. The prime movers were Drs. W. E. B. Davis, J. D. S. Davis, H. P. Cochrane, and H. M. Rosser and a few others. Dr. W. E. B. Davis took counsel with his old teacher, Dr. Haggard, who advised that gynecology be included, which was accordingly done. It soon developed that the new organization was considered by certain men in authority in the State Medical Society to be antagonistic to the latter. This feeling did not render the movement popular. Before the year was out it became patent that the plans must be changed or disaster would probably overtake the new enterprise; whereupon Dr. Davis, encouraged by the advice of Dr. Haggard, invited a considerable number of representative men throughout the South to meet with the Alabama Surgical and Gynecological Association in Birmingham to consider the advisability of organizing an association embracing the entire South. Only a few of those invited responded in person; about eighty wrote letters of approval. The result was the launching of the Southern Surgical and Gynecological Association, with Dr. Haggard as president and Dr. Davis as secretary.

At the end of its first year the new association was still wabbling upon its first legs. The issues were in doubt, perhaps more apparent than real. At this juncture Dr. Haggard telegraphed Dr. Hunter McGuire, who was not present at this or the former meeting, asking if he would accept the presidency. Dr. McGuire, who could sight at long range without the aid of an aeroplane, promptly replied that he would. Davis in his Presidential Address (1903) says: "When it became known that Dr. McGuire had accepted the presidency and was in sympathy with the organization its success seemed fully assured." It may very pertinently be asked: What organization could fail to go when inspired by the enthusiasm of Davis, censored by the wisdom of Haggard, and vitalized by the magic touch of McGuire?

What I have said is the briefest possible epitome of the history of the origin of the Southern Surgical and Gynecological Association. Also the credit given to the promoters is meager compared to the magnitude of their labors. But what about those who contributed to its formation and growth, whose names have not as yet even been mentioned? It is to be regretted that the proprieties of good usage will not permit us to discuss those who are still with us in the flesh.

Could we send a wireless across the Styx, which, according to Greek mythology, flows seven times around the World of the Dead, and ask Davis and Haggard and McGuire if they, and they only, deserve credit for this monumental Association, we may be sure that the answer would come back somewhat after this fashion: "Nay, verily; there be George J. Engleman, and J. McFadden Gaston, and Bedford Brown, and Cornelius Kollock, and Richard Douglas, and A. M. Cartledge, and Manning Simmons, and David W. Yandell, and Joseph Price, and W. W. Potter, and B. E. Hadra, and H. H. Mudd, and F. T. Meriwether, and Chas. M. Rees, and Roswell Park, and T. J. Crofford, and Henry F. Campbell, and Lehman H. Dunning, and Willis G. MacDonald, and J. C. Munro, and Jos. T. Jelks, and Jno. C. LeGrande, and H. P. Cochrane, and W. B. Rogers, and John S. Cain, and Claudius H. Mastin, and James B. Murfree, and Herbert N. Nash, and Wm. R. Pryor, and Benj. W. Taylor, and J. T. Wilson, and Thaddeus A. Reamy, and R. B. Maury, and W. F. Westmoreland, Sr., and R. A. Kinloch, and Virgil O. Hardon, and De Saussure Ford, and W. T. Briggs, and A. B. Miles, and J. T. Y. Paine, and W. H. Wathen, and A. H. Ferguson, and Maurice H. Richardson, and a host of others, all of whom contributed their quota to the upbuilding of the Southern Surgical and Gynecological Association, and without whose support it could not have survived. These celebrities, having ceased from their labors, rest with us under the shade of the trees whose leaves are for the healing of the nations."

Friends, I have read the histories and looked upon the portraits and statuary of our nation's founders; I have stood with uncovered head in the presence of the ashes of Britain's mighty dead; I have gazed in awe at the sarcophagus of France's hero Emperor, whose mighty step made the world to tremble; I have walked through the gorgeous palaces of the Hapsburgs; I have sat beside the soft blue waters of the Lucerne, where William Tell is said to have rested; I have studied in Edinburg's famous Royal Infirmary, founded and granted by a scion of my own ancestry; yet I declare to you that in neither instance was I more impressed, more overwhelmed with the sanctity of the presence by which I stood, or more visualized by the greatness of their achievements, than I am tonight as I humbly stand in your presence contemplating the lives of our illustrious predecessors, the fruits of whose labors we are privileged to enjoy.

We are to be congratulated that the grim reaper has robbed us of only a single Fellow during the current year. For him and his loved ones we mingle our tears. In this connection allow me to add that it is the source of the greatest gratification to see the vacancies which unfortunately must occur in our ranks rapidly filled by men of supreme ability and renown, the very choice of the land. Indeed, we could not afford to admit any one except he be properly prepared, thoroughly grounded in ethics, loyal to an organized profession, possessed of an unsullied character, and give promise of untiring zeal.

A careful study of the Constitution and By-laws shows that this Association was not only founded upon sound principles but that its provisions have been amplified from time to time to meet changing conditions, adapting itself always to that which was most expedient. For instance, at first the membership was limited to one hundred; now it is two hundred. Formerly no Honorary Fellows were permitted; now the Constitution provides for twenty-five.

Being a Southern institution, only southern men were embraced within its membership at first. Even on this limited basis the horizon of its possibilities widened so rapidly that early in the history of the Association it was determined to invite eminent men from north of the Mason and Dixon line to become members. In my humble judgment this is one of the very wisest things the Association has ever done. I cannot overstate the advantages which have grown out of this innovation. While the Association will ever remain Southern in name and habitat, it has long since become national in its membership and world-wide in its sphere of influence! Science, men of science, hu-

manitarians, know no geographical boundaries, nor nationality, nor creed, either political or religious! To them there is no Mason and Dixon line! We be brethren in the truest sense of the word!

The Constitution as first adopted says: "The object of this Association shall be to organize the profession of the South in the most efficient manner possible for the advancement of the sciences of surgery and gynecology." A few years later, and ever since, the same article reads: "The object of this Association is to further the study and practice of surgery and gynecology among the profession of the Southern States." Note the difference. In the first instance, "to organize the profession of the South" is stressed; in the latter this feature is omitted altogether, while "the study and practice of surgery and gynecology among the profession of the Southern States" is alone mentioned.

Now, then, in harmony with the wise changes that have already been made in this basic Article of the Constitution, and in view of the fact that we are no longer provincial, I recommend, by virtue of the exalted position with which you have honored me, that we drop the terminal words "among the profession of the Southern States" and let this Article read, as it is in fact, "The object of this Association is to promote the study and practise of surgery and gynecology."

In my opinion Article IV, Section I, which defines who may become members, should be so amended as to prescribe the minimum number of years the applicant must have practised his specialty and the percentage of his work devoted to surgery or gynecology, as the case may be. This section will, of course, include the plan, adopted by the Council last year, providing for applications and recommendations. I further suggest, as being more in keeping with the dignity of this body, that the designation "Fellow" be substituted for "member" wherever the latter occurs in the Constitution and By-laws.

Important as is our Constitution and much as we revere it, we possess something higher and better. Call it the *esprit de corps;* or, if you please, "the unwritten law." I can best describe it by an illustration. Among the crown jewels, carefully guarded in the tower of London, there is to be seen a massive golden salt cellar. Now, tradition tells us that with the nobility the salt cellar plays an important rôle. On the dining table, the place where it is set, marks the dividing line, the guests of honor sitting above; those not so distinguished must sit below the salt cellar. In the great annual three-day feasts of the Southern Surgical and Gynecological Association the salt is placed before every man's plate! Ours is a true democracy! I confidently believe that this feeling obtains with every Fellow, whether he be from the South, the North, the East, or the West.

In preparing for this meeting I read every presidential address and *In Memoriam* in the twenty-six volumes of *Transactions;* also much of the other data found therein. One cannot study these historical records without being impressed with the high order of ability, the sincerity of purpose, the exalted character of the men who made them. The *Transactions*, taken as a whole, bear testimony to a comprehensive understanding of the mission of surgeons and gynecologists, of the inestimable value of organized effort, of the demand for higher education, and of the part incumbent upon this Association in the development of the science and practise of surgery and gynecology. The responsibility of maintaining this high standard rests upon us, we could not shirk it if we would. It may be truly said that this Association is a heritage from our famous predecessors. I rejoice to believe that their mantle has fallen upon our shoulders. May we wear it worthily!

The American people have long since come to appreciate the greatness of the Virginia statesman who wrote the Declaration of Independence. As generations come and go, and our institutions adjust themselves to the principles of that immortal document, we see more and more clearly the wisdom, the statecraft, the prescience, its author must have possessed. Those of us living today have inherited an abiding faith in Jeffersonian doctrines. We cling to them with every assurance that their embodied wisdom as shown by their adaptability to the neces-

sities of a free and independent people is a guarantee that shall ever, shall ever, safeguard our national life and preserve inviolate the rights of the individual!

Recently I had the pleasure of examining an African tree-drum. It is a wonderful instrument, hewn from the trunk of a tree, without membrane or other addition. The slightest tap of my finger set in motion sweet toned vibrations. Under suitable conditions the tree-drum can be heard for ten miles. It is used to communicate from villiage to village, antedating by untold centuries the Marconi wireless. Dr. W. R. Lambeth told me that while traveling through the heart of the Congo with a caravan of sixty men his provisions gave out. He applied to one of the native villages for supplies. By means of a relay of tree-drums they sent a message for a distance of thirty-five miles, securing the desired necessities. On another occasion Dr. Lambeth telephoned a hundred and thirty miles after the same manner.

As I listened to the marvelous sounds of the tree-drum, and realized what a part it plays in the lives of the natives of the dark continent, I exclaimed, "Oh, tree-drum, tell me of your people, their origin, their traditions, their religions, their customs, the wrongs that have been heaped upon them, the subjugations they have had to endure! Oh, tree-drum, whisper to me a note of prophecy. What will civilization, and the missionary, and the medical man, and science do for your people? Will they lift them from the slough of ignorance, and superstition, and disease, and sin, and bondage, and set Africa as a jewel among the continents of the world?" And with the ear of faith pressed close to its resonant bosom I heard, a note of triumphant optimism come echoing back to me!

I need not apply these two homely illustrations connecting the past with the future, the one taken from our national compass and the other from the jungles of Africa. They suggest their own application.

Friends, what I have said is simply a review of that which you already knew better than I; something of the famous surgeons of our southland, the origin of our Association, the personnel of a few of its Founders, the broad and enduring basis upon which the organization was builded, its purpose and scope as indicated by its Constitution and *Transactions*, the high order of work being done, the celebrated men composing its ranks in the past as well as the present, the esteem in which our Fellows are held at home and abroad, the continually increasing number of worthy men who are knocking at our door, the delightful democracy that pervades our deliberations — and leave it with you, Sirs, to judge whether or not we are justified in saying: The wisdom of the past is a prophecy of the future!

[Following the address Dr. Long showed twenty-five lantern slides of famous Southern surgeons and Fellows of the Association.]

GALL-STONES DURING THE COURSE OF 1,066 ABDOMINAL SECTIONS FOR PELVIC DISEASE[1]

By REUBEN PETERSON, M.D., Ann Arbor, Michigan
Professor of Obstetrics and Gynecology, University of Michigan.

AFTER some years of discussion it now seems to be the consensus of opinion that the appendix should be inspected when the abdomen is opened by the lower abdominal incision, unless the nature of the pelvic disease would endanger the patient, were the uncontaminated peritoneum investigated. Although the operator has every reason for believing that the contents of a pyosalpinx are sterile, he would not feel justified in inspecting the appendix for fear of infecting another part of the abdomen. This rule would be disregarded if the appendix were situated below the brim of the pelvis, below the gauze packing protect the upper abdominal peritoneum.

[1] Read at the meeting of the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 16, 1914.

If the appendix looks pathologic or if the history shows attacks of pain in the right iliac fossa, probably appendiceal in origin, the appendix is removed so that the patient may be spared another operation. Some operators go so far as to remove every appendix when the abdomen is opened for other purposes, on the ground that the additional operative procedure does not carry with it any increased mortality, and that the patient has the right to expect that she will not be subjected at some future time to disease originating in this organ.

Shall the same kind of reasoning, then, be applied to the gall-bladder when the abdomen is opened for pelvic disease? In many respects the cases are parallel. Neither class of patients wants to be put to the inconvenience or expense of a second operation if the disease, or what may result in disease, in the extrapelvic portion of the abdomen can be cared for at the same operation. If gall-stones have given symptoms, either as indigestion or "gastralgia" or distinct attacks of gall-stone colic, the patient will not recover her health, even after the most skillful pelvic operation, if the gall-bladder be not attended to for existing disease or calculi. She has the right, therefore, to demand of the surgeon that so far as possible all of her pelvic and intra-abdominal derangements be cured at one and the same operation. To the surgeon is left the question of what constitutes disease of the gall-bladder or dangerous conditions so far as the pelvis be concerned and under what conditions he will be justified in exploring the gall-bladder region through the lower abdominal incision. Also after exploration he will have to decide whether further operative procedures be necessary, and finally the nature of the operation to be performed in each individual case.

In the present paper it is proposed to discuss some of these questions in the light of the findings of the palpation of the gall-bladder in 1,066 cases of abdominal section where the abdomen was opened low down for symptoms other than those of the gall-bladder. It must be kept distinctly in mind that the discussion is limited to those cases where the principal disease is not in the gall-bladder but in the pelvis and gall-stones and other disease of the gall-bladder and the biliary passages are present as incidents to the pelvic disease, this decision being arrived at through routine palpation of the gall-bladder region by way of the lower abdominal incision.

First of all I believe it should be stated emphatically once and for all that the day of the small abdominal incision has long since passed. The small inch or two-inch abdominal incision shows that the operator does not fully realize what modern efficient surgery demands of him. An ovarian cyst removed through an inch and a half abdominal incision means that the operator is entirely ignorant of many intra-abdominal conditions, which, if they exist, may mean the future discomfort or even death of his patient. Small transverse suprapubic incisions should also be dispensed with and the abdominal incision, either transverse or preferably longitudinal, should be large enough to admit the operator's hand, thus permitting a thorough exploration of the abdominal cavity.

Just as in inspection of the appendix, exploration of the gall-bladder region is contra-indicated in the presence of pus or other pelvic conditions whereby infection can be carried upward by the operator's hand. When dealing with inflammatory pelvic lesions exploration prior to the breaking down of the adhesions limiting the infectious process to the pelvis is a questionable procedure, since, if disease of the gall-bladder be discovered, an additional abdominal incision is of doubtful propriety in the presence of pelvic infection, even if the incision over the gall-bladder be made independently of the lower abdominal incision.

Again, gall-bladder work is contra-indicated if the patient's condition at the close of the pelvic operation is such as to preclude additional surgical manipulation. Only poor surgical judgment would lead to the prolongation of the operation beyond certain well-defined limits. Far better would it be for the patient to run the risk of a subsequent operation upon the gall-bladder than to prolong the operation to the point where the patient might die from shock.

Coincident gall-bladder operations are also contra-indicated where the pelvic operations are performed for malignant disease, unless the operation upon the biliary passages or gall-bladder be urgently demanded for the relief of great suffering. For instance, it would be inadvisable to remove gall-stones at the same time the uterus is being removed by the abdominal route for cancer of the cervix. Aside from the great shock of radical operations for the removal of the cancerous uterus, the ultimate results of such operations are so doubtful under the best conditions that the gall-bladder should not be interfered with unless the seat of acute symptoms. And the presence of such symptoms makes the gall-bladder or the biliary passages the primary disease and places such cases in a different category from those discussed in this paper.

Of primary importance is the frequency with which the gall-bladder is affected coincident with pelvic disease and what shall be considered a diseased condition of the gall-bladder. I approach the consideration of what shall constitute disease of the gall-bladder with considerable hesitation, since I am fully aware that from the nature of my work I am not as qualified to answer the question as dogmatically as are those who have to deal with many cases of primary gall-bladder disease. I can judge the matter only from my own limited experience and from what I can glean from a perusal of the experience of others. But the gynecologist must face the situation and deal with it upon its merits or else dodge the question altogether. He must care for the pelvic condition and either not cure his patient or possibly subject her to subsequent suffering unless relieved by a second abdominal operation. More and more are we coming to believe that gall-stones, while not producing typical attacks of gall-stone colic, may give rise to many symptoms incorrectly attributed to indigestion. Those symptoms may not be very pronounced, although a source of considerable inconvenience to the patient. Even a careful history will sometimes fail to more than arouse suspicion of the presence of gall-stones. Shall the gynecologist remove the gall-stones at the time of the pelvic operation, or, in other words, does the mere presence of gall-stones warrant their removal when they are discovered during the course of another operative procedure?

I am more and more coming to the conclusion that, other things being equal, gall-stones are a certain menace to the patient and would better be removed as an incident to pelvic operations, provided this can be done with slight additional risk to the patient. Certainly if we follow the precepts of those doing the most gall-bladder work we would advocate removal, for they tell us that early uncomplicated gall-bladder surgery should be attended by not more than a one per cent mortality and that the high mortality follows neglected cases. Who can say how or when a gall-stone or a collection of such stones in the gall-bladder will give rise to serious symptoms in a given patient? Certainly this cannot be predicted from the number or size of the stones. A small stone may be productive of very serious consequences, while a large stone may apparently give rise to no symptoms and be of very little consequence. I recently removed two hundred fair-sized gall-stones from a patient at the same operation in which a hysterectomy was performed for an uterine fibromyoma. The closest questioning prior and subsequent to the operation failed to reveal any symptoms referable to the gall-bladder.

Certainly it is true that we remove an appendix which appears diseased or is in a condition which may give rise to subsequent disease. Why, then, should we hesitate to remove gall-stones at the time of the pelvic operation if they represent an abnormal condition of the gall-bladder and may prove a source of future annoyance and even menace to the patient? In my opinion we should not hesitate so to act, provided we are justified in thinking that the additional surgical procedure can be performed with slight additional risk to the patient, and that the gall-bladder operation can be so performed as not appreciably to prolong the convalescence or leave the patient with symptoms not present before or worse than those from which she suffered prior to the operation. In only two instances have I regretted removal of gall-

stones at pelvic operations. In many more instances have I either regretted not removing the stones when such a procedure was perfectly possible or was forced to regret that the conditions at the time of operation were such as to contra-indicate their removal.

In an article read before the American Gynecological Society in 1910, entitled "Gall-stones during Pregnancy and the Puerperium," I referred to 542 women in the University of Michigan gynecologic clinic and in my private clinic whose gall-bladders had been palpated during the course of pelvic operations. Of these 542 patients 64, or 11.8 per cent, had gall-stones. Since that time the number of patients thus inspected has reached 1,066, whose gall-bladder findings I desire to submit for your consideration. The two clinics from which these cases have been taken are strictly gynecologic as far as the University Hospital is concerned, and almost the same statement can be made of the private hospital clinic. In the public hospital every patient admitted is examined by the resident physician and assigned to the different services in accordance with the patient's major complaint. Hence, in every case where gall-stones were found at the gynecologic operation they were either unsuspected or their symptoms were of minor importance compared with the pelvic disease.

Among these 1,066 patients gall-stones were found 135 times, or in 12.66 per cent of the cases. It is interesting to note that the percentage of gall-stone cases at the University clinic was 11.97, while at the private clinic the percentage was 14.84. The explanation of this difference in the frequency of gall-stones in the two services lies in the possibility of some gall-stones being overlooked in the public clinic, where the operations are performed by the head of the department and his assistants during the third and fourth years of their services. I mention this, since I am certain that stones can be easily overlooked in tense gall-bladders unless great care be exercised at the time of the examinations or if the fingers have not been trained to such examinations.

Kelly found gall-stones in 14.5 per cent of 48 women whose gall-bladders were explored through a low abdominal incision. In each instance where the gall-stones were found the woman had been operated upon for either myoma or ovarian cyst. Kelly estimates gall-stones to be present in about 8 per cent of all his cases. Of 1,244 women operated upon at the Mayo clinic for uterine myomata 92, or 7.1 per cent, had gall-stones.

It has long been recognized that gall-stones are more common in women than in men. Schroeder states that in Germany they are found in 20 per cent of female and 4.4 per cent of male necropsies. In 228 necropsies on women Brockbank found gall-stones in 7.9 per cent, while in autopsies on 542 males gall-stones were present in only 2.9 per cent of the cases. In 19,974 autopsies of both sexes reported from Erlangen and Munich, there were 1,852 cases of gall-stones, or 7.8 per cent. Mosher, in 1,655 autopsies in both sexes at the Johns Hopkins Hospital, found gall-stones in 6.94 per cent of the cases. In 1,037 male necropsies they were present in 5.4 per cent of the cases, while in 619 autopsies on females, gall-stones were present in 9.37 per cent of the cases.

The high percentage of gall-stones in the present series (12.66) may be due to one or more of three factors: the relative high average age of the patients examined, since it is fairly well established that the older the person the greater the liability to gall-stones; the high percentage of women in the series who have borne children; or, finally, to the large proportion of uterine and ovarian neoplasms present in the women examined for gall-stones. In Table I the cases have been arranged according to ages.

TABLE I

1,066 patients examined for gall-stones arranged according to age.

Ages	Number of Cases	Number of Cases with Gall-stones	Percentage of Cases with Gall-stones
16 to 20	13	1	7.69
21 to 30	276	19	6.88
31 to 40	378	44	11.6
41 to 50	280	42	15.0
51 to 60	79	18	22.78
61 to 70	24	7	29.16
Ages unknown	16	4	
	1,066	135	12.66

A study of this table shows that the percentage of gall-stones increases with each decade from the age of 20, the single case of gall-stones occurring between the ages of 16 and 20 being a great rarity and therefore to be disregarded. The percentages of patients with gall-stones vary from 6.8 per cent in 276 patients examined between the ages of 20 and 30 to 29.1 per cent in 24 women between the ages of 61 and 70. The percentages at the different ages correspond fairly well with those obtained by Mosher from the autopsies at the Johns Hopkins Hospital, although the percentage of gall-stones is relatively lower than those in the present series (9.37 and 12.66).

Harley estimates that 75 per cent of cholelithiasis occurs in persons over 40; 20 per cent between 30 and 40; 4 per cent between 20 and 30, and 1 per cent in persons younger than 20. This is an estimate and agrees fairly well with Mosher's figures of cholelithiasis in 1,655 autopsies on both sexes (see Table II).

TABLE II

Occurrence of gall-stones according to age.

	Mosher — 1,655 Autopsies Both Sexes		Harley Estimate
Age	Number of Cases with Gall-stones	Percentage of Cases with Gall-stones	Percentage of Cases with Gall-stones
Over 40.....	91	79.13	75
30 to 40.....	18	15.65	20
20 to 30.....	5	4.34	4
Below 20.....	1	.86	1
	115		

Since cholelithiasis is more common in women, it becomes necessary to arrange different series of cases in women according to the age in which gall-stones were found in order that deductions may be made. This I have done in Table III with Mosher's 618 autopsies in women at different ages and the present series of 1,066 cases, all of them in women, since the gall-bladder condition was discovered during the course of pelvic operations.

TABLE III

Occurrence of gall-stones in women according to age.

	Peterson — 1,066 cases		Mosher — 618 cases	
Age	Number of Cases with Gall-stones	Percentage of Cases with Gall-stones	Number of Cases with Gall-stones	Percentage of Cases with Gall-stones
Over 40.....	67	51.14	44	75.85
30 to 40.....	44	33.58	11	18.96
20 to 30.....	19	14.50	2	3.27
Below 20.....	1	.76	1	.17
Ages unknown	4			
	135		58	

While other factors, such as the number of patients examined at the different ages, must be taken into consideration in arriving at any conclusion, the tables show conclusively that in both males and females gall-stones are much more common after the age of 40. That age is not the only factor in the production of gall-stones is shown by the relatively few cases in patients over 40 (51 per cent as compared with Mosher's 75 per cent) and the relatively high percentage of patients with cholelithiasis between the ages of 30 and 40 (33 per cent as compared with Mosher's 18 per cent). It is possible that this other factor besides age favoring the production of biliary calculi at the ages mentioned may be the comparatively large number of uterine and ovarian neoplasms occurring during these ages.

In my former paper, already referred to, I have taken up at some length the reasons why pregnancy and the puerperium favor the formation of gall-stones. Among the causes may be mentioned, the encroachment of the enlarging pregnant uterus upon the liver and its biliary passages, thereby favoring the stagnation of the bile stream, the resulting infection of that stream and the formation of gall-stones; the same results produced by the limitation of the movements of the diaphragm and the visceroptosis resulting from relaxed abdominal walls following labor. Constipation in women, produced by the lack of exercise and the pregnant state, also tends toward infection of the bile ducts and gall-bladder.

Whatever may be the explanation, it is undoubtedly true that women who have

borne children are more subject to gall-stones. In the previous statistics 75 per cent of the patients with gall-stones had borne children. In the present series the proportion is even greater, since 114, or 84.41 of the 135 who had gall-stones, had borne one or more children. Mayo-Robson claims that 90 per cent of women with gall-stones have borne children, the same percentage being found by Mayo in a large series of cases of gall-stones in women, and he further adds the interesting statement that 90 per cent of the patients with gall-stones identify the beginning of their symptoms with some pregnancy.

Are gall-stones more common in women with certain diseases of the pelvis? In order to answer this question I have grouped the neoplasms for which the operations were performed with a view of ascertaining the frequency of gall-stones when removal of the growths was made by the abdominal route. Gall-stones were present in 10.8 per cent of 285 cases of fibromyomata, in 14.5 per cent of 103 sizable ovarian cysts, and in 19.6 per cent of carcinoma of the cervix and body of the uterus. We have already seen that in a large series of cases of myomata at the Mayo clinic (1,244 cases) the percentage of coincident gall-stones was 7.1 per cent. Hence, Mosher's findings of 13 cases of gall-stones in 58 women with fibromyomata, or in 22.4 per cent, are altogether too high to be accepted as the usual percentage, and probably were due to other causes, chief among these being the age when such lesions of the uterus and its appendages are most common. For in the present series in 55 cases of gall-stones occurring in patients with these neoplasms 44, or 80 per cent, were above 40 years of age. The high percentage of gall-stones with cancer of the uterus is probably explained in a similar manner, since all of the 11 patients with this disease and with incidental gall-stones were over 40 years old. Looking at the question from another standpoint, in 382 patients with either fibroids, ovarian cysts, or cancer of the uterus, but without gall-stones, only 52.36 per cent were over 40. In other words, age, not disease, is the determining factor in the formation of gall-stones.

The observations and operative work upon the gall-bladders were begun years ago when drainage was much more popular than removal of the gall-bladder. Since good operative results were obtained by cholecystostomy, this method was followed in all of the 57 cases when the calculi were removed, except in two cases where it seemed best to do cholecystectomies. To insure adhesions in almost every instance the gall-bladder was sutured to the parietal peritoneum, which possibly explains some of the soreness and dragging sensations in the gall-bladder region, which will be spoken of more in detail when end-results are considered.

In no case was there leakage or symptoms of peritoneal irritation from the drained gall-bladder. The only two operative deaths in the 57 patients from whom gall-stones were removed incidental to the pelvic operations cannot be ascribed to the surgery of the gall-bladder, but to peritonitis from unsuspected virulent, purulent foci within the pelvis.

In almost every instance the gall-bladder drainage tube came away in a week or ten days, and with few exceptions the gall-bladder wound had practically closed when the patient left the hospital at the end of three weeks. In other words, the patient's convalescence was little, if any, prolonged by the additional gall-bladder operation.

The most interesting part of a work of this kind is the most difficult. I refer to the end-results of the operations where the gall-stones were removed and the post-operative histories of the patients where the stones were found but not removed. Those who have tried to arrive at end-results through correspondence with patients know that the more information asked the less is received. Hence, the form letter was restricted to inquiries regarding the presence or absence of symptoms referable to the gall-bladder, for this was the point of the investigation, not the results of the pelvic operations. In many instances it became necessary to call in the aid of the physicians who referred the patients, but in the majority of cases the end-results are based upon the answers of the patients themselves.

The 135 patients with gall-stones may be divided into two classes: (a) those from whom the gall-stones were removed (57), and (b) those where the gall-stones were palpated but for one reason or another were not removed (78). Forty-five, or 81.8 per cent of the first class, and 55, or 77.4 per cent of the second class, were traced and their replies analyzed as follows:

(a) Patients where gall-stones were removed incidental to pelvic disease.

Among these patients there were two primary deaths and 45 of the remaining 55 patients were traced. Of these 45 patients, 29, or 64.4 per cent, wrote that they had had no symptoms referable to the gall-bladder since their operations; that is, they had had no gall-stone colic, no jaundice, no pain in the gall-bladder region nor symptoms of indigestion which could be ascribed to biliary calculi.

On the other hand, 16 patients, or 35.5 per cent of the cases, reported symptoms having to do with the gall-bladder region. However, most of those with symptoms, 11 out of the 16 patients, had had no gall-stone colic nor other symptoms which would lead one to suspect that they had had a recurrence of the gall-stones. Their symptoms were dragging pains in the right side in the neighborhood of the incision or soreness in the same region. As before stated, these symptoms are attributable to the method of operation employed, the dragging upward of the gall-bladder and the fastening of it to the parietal peritoneum. The occurrence of such symptoms in a certain proportion of cases where the gall-bladder is drained by this method has been noted by other observers and has led to drainage in the natural position of the gall-bladder and non-attachment to the parietal peritoneum. In further series of cases this latter method will be employed with the expectation that the symptoms described above will be largely done away with.

Five patients had distinct gall-stone attacks following removal of the calculi and drainage of the gall-bladder. One patient had the gall-bladder removed nine years after the cholecystostomy, no stones being found. Another patient was operated upon ten years after and fifteen stones were removed. Still another patient, according to the testimony of her physician, suffered from repeated attacks of gall-stone colic which did not cease until she had passed a number of stones per rectum. Two other patients had what they thought were attacks of gall-stone colic just after returning home from the hospital but had had no recurrence for a number of years at the time of their reports.

Summarizing these findings, it is fair to state that 40 out of the 45 patients, or 88.8 per cent, were free from gall-stone colic following the operations, while 11.1 per cent had a recurrence of the gall-stone colic. Whether all the stones were not removed at the time of operation or whether calculi re-formed after their removal, it is difficult to say. Occasionally gall-stones do re-form, but from the testimony of those with the most experience it is exceedingly rare.

It is to be regretted that time has not permitted a careful perusal of the histories in reference to the presence of symptoms prior to the pelvic operations, but such a research is so time-consuming that it has been left for a subsequent paper. It can only be stated that while in a few cases gall-stones were suspected prior to the pelvic operations, in no instance were the symptoms such as to overshadow the importance of the pelvic condition. However, it is only fair to say that more careful gall-bladder histories may increase greatly the number of suspected cases.

(b) Patients where gall-stones were found but not removed at the time of the pelvic operations.

As expected, the primary mortality was high in this class of cases, for it included many patients with complicated tumors and patients operated upon radically for cancer of the uterus. There were 7 primary deaths from causes it is unnecessary to detail since they have no especial bearing upon the main purposes of this paper. They are only of importance as showing the severity of operations and why it was deemed inadvisable to remove the gall-stones at the same operation.

Of the 71 remaining patients, 55, or 77.4 per cent, were traced. Four patients died

subsequently, three from causes unconnected with the biliary tract and one six years after the pelvic operation from what was apparently hepatic cancer preceded by attacks of biliary colic.

Of the 51 surviving patients from whom replies were received, 32, or 62.7 per cent, had no symptoms referable to the gall-bladder, although one or more gall-stones were present in each instance when they were discharged from the hospital. On the other hand, 19 patients, or 37.2 per cent, wrote that they had had symptoms referable to the gall-bladder; 10 had had distinct gall-stone attacks; 6 had suffered from pain in the region of the gall-bladder; 2 had been operated upon for gall-stones, while one had been jaundiced.

Had it been possible to perform cholecystostomy at the time of these pelvic operations over 90, instead of 62 per cent of these 51 patients, would have been spared symptoms referable to the gall-bladder. But in many of the cases additional operative procedures were clearly contra-indicated, and if they had been carried out would have greatly increased the primary mortality. Still in some of the cases the gall-stones could have been removed had we been possessed then of the evidence now at hand, that gall-stones left at the time of pelvic operations will give rise to distinct subsequent gall-bladder symptoms in 30 per cent of the cases. In another series of cases I would remove gall-stones in every instance unless such a procedure be distinctly contra-indicated.

CONCLUSIONS

1. Except when contra-indicated by the condition of the patient or the possibility of contaminating clean peritoneum, the gall-bladder should always be palpated when the abdomen is opened for pelvic disease.

2. Hence, the small abdominal incision should give way to one large enough to permit of thorough exploration of the abdominal cavity.

3. Gall-stones will be found incidental to pelvic disease in 10 to 15 per cent of the cases.

4. Their frequency will depend upon the ages of the patients more than upon the variety of the pelvic disease.

5. As with gall-stones in general, in women with or without pelvic disease, the older the patient the more liable is she to have gall-stones.

6. Gall-stones are much more common in women who have had children; in the present series of cases 84.4 per cent of the 135 women with gall-stones incidental to pelvic disease had borne children.

7. When gall-stones are removed at the time of pelvic operations, from 85 to 90 per cent of the patients will have no subsequent symptoms referable to the gall-bladder, provided the proper technique be employed.

8. When gall-stones are not removed either because their mere presence is not thought to warrant their removal or because the condition of the patient forbids further operative procedure, 30 per cent of the patients will suffer subsequently from gall-stone attacks or other symptoms referable to the gall-bladder.

9. Therefore, since gall-stones are always liable to produce symptoms and at times are a distinct menace to the patient, they should be removed when the abdomen is opened for pelvic disease, if this can be done without much additional risk to the patient.

EXPERIMENTS IN THE PRODUCTION OF ABORTION AND LABOR BY USE OF PLACENTAL EXTRACTS[1]

By ARTHUR H. CURTIS, M.D., Chicago

MUCH thought and energy have been expended in efforts to discover how therapeutic abortion or labor at term may be produced without operative interference. Thus far there has been obtained but little knowledge of the stimuli which cause emptying of the pregnant uterus, and attempts to find harmless oxytocic substances of essential clinical worth have never met with success.[2]

In the course of efforts to determine what may safely and efficiently be given to patients who fail to go into labor at term, it was decided to employ subcutaneous injections of whole blood derived from healthy puerperal patients. This was used in three cases on the service of Dr. Charles E. Paddock at St. Luke's Hospital. In one case labor pains occurred but ceased in a few hours; a second patient failed to respond, and a third had severe pains. Toxic effects were not observed, but it was decided to discontinue the work until various experiments upon animals had been performed.

As shown by Veit and others, placental material is present in the circulation. Stimulated by the suggestion of positive results in the cases just mentioned, and with the idea that circulating placental material might be responsible for the results noted, it seemed desirable to study the effects of placental extracts upon pregnant animals.

Human placentas were obtained under aseptic precautions, finely divided, washed free from blood, and extracted for 24 to 96 hours with normal salt solution. Only a few experiments were conducted at any one time, and a fresh placenta was used in each set of cases. Pregnant rabbits and guinea pigs served as experimental animals. Injections were made subcutaneously, care being taken not to exert undue pressure in any locality. For details of experiments see Table I.

TABLE I

SUBCUTANEOUS INJECTION OF PREGNANT RABBITS AND GUINEA PIGS WITH EXTRACT OF HUMAN PLACENTAS IN NORMAL SALT SOLUTION

Number	Dosage	Result
Rabbit 1	40 ccm.	Abortion of one one-third developed macerated fœtus on third day. Killed. Five fœtuses in utero in varying stages of absorption. Corpora lutea absent. No signs of infection.
Rabbit 2	25 ccm.	Abortion of five three-quarters grown, slightly macerated fœtuses on fourth day. Killed. Corpora lutea absent. No signs of infection.
Rabbit 3	20 ccm.; dose repeated two days later	Rabbit well. Killed four days after second injection. Seven corpus luteum cysts in left ovary, four in right ovary. These are the largest corpus luteum cysts yet seen in a rabbit. Uterus contains four young fœtuses in each horn, all partially absorbed. No signs of infection.
Rabbit 4	20 ccm.	Killed two days later. Uterus boggy. Contains half dozen milky accumulations, suggestive of absorption of ova.
Guinea pig 1	20 ccm.	Aborted three immature fœtuses. Died on third day. Uterus contains two fœtuses; one with separation of placenta, the other with placenta still attached. No signs of infection.
Guinea pig 2	10 ccm.	Killed on sixth day because not well. Fœtuses mostly absorbed, parts of only two remaining. No signs of infection.
Guinea pig 3	7 ccm.	Aborted two two-thirds developed fœtuses within 24 hours. Autopsy. One fœtus with detached placenta in right horn or uterus. No signs of infection.
Guinea pig 4	4 ccm.	Aborted three nearly mature fœtuses on third day. Discharged in good condition.
Guinea pig 5	3 ccm.	Aborted three two-thirds developed fœtuses on second day. Discharged in good condition.
Guinea pig 6	2 ccm.	Littered two pigs within 24 hours. One died same day; other healthy. Mother discharged in good condition.
Guinea pig 7	2 ccm.	Littered two hearty pigs within 24 hours. Mother discharged in good condition.
Guinea pig 8	2 ccm.	Littered two pigs next (second?) day. One died day following; other well. Mother discharged in good condition.
Guinea pig 9	3 ccm.	Littered respectively two, two, two, and one normal offspring, after periods ranging from 2½ to 3½ weeks.
Guinea pig 10	1⅗ ccm.	
Guinea pig 11	1 ccm.	
Guinea pig 12	¼ ccm.	

Because placental material is present in the maternal circulation, it would seem reasonable to expect from the use of blood of pregnant and puerperal women an effect similar

[2] The work of Kastle and Healy (J. Infect. Dis., 1912, x, 244 and 378), whose report was discovered after the completion of this paper, is of interest in this connection.

[1] From The Memorial Institute for Infectious Diseases and the Gynecological Department of St. Luke's Hospital, Chicago.

to but less powerful than that obtainable with placental extract. Table II illustrates results obtained in a series of such cases.

TABLE II

SUBCUTANEOUS INJECTION OF PREGNANT GUINEA PIGS WITH DEFIBRINATED BLOOD FROM PREGNANT AND PUERPERAL WOMEN

No.	Dosage	Result
13	12 ccm. pregnant	Ova absorbed.
14	10 ccm. puerperal	Killed in four days. Beginning absorption of one fœtus (?). Two appear normal.
15	10 ccm. puerperal	Progressed to term.
16	8 ccm. pregnant	Mature fœtus found dead. (Stillbirth?)
17	5 ccm. puerperal	Littered three pigs three weeks later.
18	5 ccm. pregnant	Aborted immature fœtuses after three days.
19	3 ccm. pregnant	Aborted three macerated fœtuses after 2½ weeks. Death five days later. Autopsy indicates death from absorption toxæmia.
20	2 ccm. pregnant	Littered one pig two weeks later.
21	1½ ccm. pregnant	Littered two pigs 2½ weeks later.
22	1 ccm. pregnant	Progressed to term.

To eliminate sources of error from injection of fluid alone, two guinea pigs were given respectively 10 ccm. and 15 ccm. of normal salt solution. Pregnancy advanced undisturbed in both animals.

In other control experiments defibrinated blood from normal, non-pregnant women was injected. These experiments gave uniformly negative results as shown in Table III.

TABLE III

SUBCUTANEOUS INJECTION OF PREGNANT GUINEA PIGS WITH DEFIBRINATED BLOOD FROM NORMAL NON-PREGNANT WOMEN

Number	Dosage	Result
23	2½ ccm.	Two young born.
24	3 ccm.	Healthy young born.
25	4 ccm.	One young born.
26	5 ccm.	Two young born.
27	15 ccm.	Two young born.
28	20 ccm.	One young born.

It was next desired to note how pregnant guinea pigs were affected by injection of guinea pig placental extract and by blood from pregnant and puerperal pigs. The details of these experiments are recorded in Tables IV and V.

TABLE IV

SUBCUTANEOUS INJECTION OF PREGNANT GUINEA PIGS WITH EXTRACT OF GUINEA PIG PLACENTA IN NORMAL SALT SOLUTION

Number	Dosage	Result
29	1 ccm.	Littered two pigs.
30	3 ccm.	Died three weeks later. In right horn of uterus three necrotic areas, each 1 cm. in diameter, evidently where fœtuses have been absorbed. In left horn a necrotic liquid placental site, with separated necrotic placenta. Almost mature macerated fœtus. No pus, bacteria, or adhesions. Death from absorption of toxines (?).
31	3 ccm.	Aborted four mature fœtuses one week later.
32	5 ccm.	Littered one pig.
33	7 ccm.	Development seemed retarded. Later progressed and littered two pigs three weeks after injection.
34	10 ccm.	Littered two pigs.
35	10 ccm.	Littered two pigs.

TABLE V

SUBCUTANEOUS INJECTION OF PREGNANT GUINEA PIGS WITH BLOOD FROM PUERPERAL AND PREGNANT GUINEA PIGS

Number	Dosage	Result
36	4 ccm. puerperal	Littered one pig.
37	10 ccm. pregnant	Littered two very small pigs. One died same day.
38	15 ccm. puerperal	Littered normally.
39	20 ccm. pregnant	Littered one pig.

SUMMARY

Sixteen pregnant rabbits and guinea pigs were given extract of human placenta in normal salt solution. In four instances pregnancy progressed undisturbed, evidently because the amount injected was very small. Three advanced cases littered within 48 hours. In nine cases, in which pregnancy was less advanced, absorption or abortion of the embryos occurred in every instance. The absence of corpora lutea in animals which came to autopsy was a noteworthy finding, as was also the presence of large corpus luteum cysts in the one guinea pig subjected to two injections of placental extract.

Ten pregnant guinea pigs were injected with defibrinated blood from pregnant and puerperal women. Five progressed to term. In two cases the results were doubtful; in three there occurred absorption or abortion of the embryos.

Subcutaneous injection of normal salt solution in two control animals did not disturb the development of pregnancy.

Six control pregnant guinea pigs were injected with defibrinated blood from normal non-pregnant women. In every instance pregnancy was undisturbed and was followed by litter of healthy pigs.

Seven pregnant guinea pigs were given extract of guinea pig placenta in normal salt solution. Pregnancy progressed (delayed?) to term with litter of normal offspring in five instances. One case terminated in abortion, and one in absorption of the embryos.

The injection of four pregnant guinea pigs with blood from puerperal and pregnant guinea pigs was followed by litter of healthy pigs. In one instance birth may have been premature.

Further studies should include a determination of the physiological properties of the oxytocic substance or substances contained in placental extracts. Through work along these lines lies hope of obtaining a product which may be efficiently used to terminate pregnancy in human subjects. Although control experiments with blood from non-pregnant women gave negative results, it is advisable to make additional controls with other tissue extracts; observation of the influence of extracts from various glands with internal secretion should be of especial interest. It would also seem desirable to inject animals with placental extract during the early stages of pregnancy for the purpose of noting changes in the corpus luteum; more knowledge of the peculiar relationship between placenta and corpus luteum might thus be gained.

CONCLUSIONS

1. Extract of human placenta in normal salt solution is oxytocic for pregnant guinea pigs and rabbits.

2. Defibrinated blood from pregnant and from puerperal women (which contains some placental material) possesses similar properties in a lesser degree.

3. Defibrinated blood from non-pregnant women appears not to disturb pregnancy in guinea pigs. The same is true of normal salt solution.

4. Extract of guinea pig placenta in normal salt solution seems to be slightly oxytocic for pregnant guinea pigs. No noteworthy influence was exerted by blood from pregnant and puerperal guinea pigs.

THE END-RESULTS OF TREATMENT OF ONE HUNDRED CASES OF FRACTURE OF THE ELBOW; IMMOBILIZATION IN HYPER-FLEXION COMBINED WITH EARLY PASSIVE MOVEMENTS AND MASSAGE[1]

By HAROLD NEUHOF, M.D., and HEINRICH FRANZ WOLF, M.D., New York
From the Departments of Surgery and Physical Therapy of the Mount Sinai Hospital Dispensary

THE unusual opportunity has been given us of studying and treating a large number of elbow fractures referred from Mount Sinai Hospital and the eight surgical departments of its dispensary. A comparative study of the results of immobilization for different periods of time and by various methods was therefore possible from the material of a number of competent observers. Our purpose is not a detailed description of the mechanism and varieties of fractures encountered, but an analysis of the results of treatment and a description of the method whereby the best results were obtained.

A brief reference to the literature is necessary for the comparison of our results with those of other writers. The meaning of "result" should be defined first. By a "perfect result" we mean one in which the full and normal range of motion is the sequel of the treatment of a fracture of the elbow. Anything short of this is termed an "imperfect result." The latter may vary from a slight varus or valgus deformity and little limitation of motion to marked change in the carrying angle and great limitation of motion. It is true that a slight deformity or a slight restriction of motion is compatible with a useful elbow; for the purposes of standardization, however, it is thought best simply to term all results "imperfect" that are not absolutely "perfect."[2] Selecting large groups of cases in which the end-results of treatment by various splints and plaster of Paris bandages were carefully observed, the following is noted: Coenen reports perfect results in 25 per cent of his cases; Cotton, in 18.5 per cent of his series; Destot, Vignard, and Barlatier, 28.2 per cent; Hilgenreiner, 21.3 per cent. The average of perfect result in the 123 cases of these authors is 23.25 per cent. Various positions of fixation of the elbow were employed in their cases, immobilization in acute flexion being practiced in very few of them. The method of fixation in very acute flexion (well termed "hyperflexion" by Ashhurst), generally ascribed to Jones of Liverpool, has been employed in occasional instances for the past forty years. It remained for Ashhurst, however, to study carefully the mechanism of the so-called Jones position for elbow fractures, and to demonstrate its advantages in a large series of cases. He reported 56 patients in whom it was employed, and the results were perfect in 81 per cent of the cases. The details of the method will be subsequently described; and we hope to prove its advantages over other postures. Why did Ashhurst not obtain a proportion of perfect results even higher than he reports? We believe the reason lies in the relatively prolonged immobilization he practiced and the absence of passive movements and massage in his after-treatment. Our paper is in part written to verify this assertion, especially in view of the opinion of many observers that the early mobilization and massage of elbow fractures are harmful procedures.

The cases we have studied are a group of one hundred consecutive elbow fractures seen from 1911 to 1914. No selection of material has been made, the one hundred cases in which the final result could be determined being taken in succession. They include simple and comminuted fractures, supracondylar fractures, and those of the humerus that enter the joint, fractures of the upper end of the radius and ulna; in short, all the types of fracture at the elbow-joint. Recent cases are not included.

[2] This standard is a high one, but we agree with Ashhurst in the definition of a perfect result. The statistics that we shall quote are taken from his admirable monograph, "An Anatomical and Surgical Study of Fractures of the Lower End of the Humerus."

[1] Presented at the February meeting of the Surgical Section of the New York Academy of Medicine.

Fractures about the elbow are chiefly injuries of childhood, but adults (nine in number) have not been excluded from our series. Fracture was most frequent in children in the tenth year. The incidence, remaining about the same in the second, third, and fourth years of life, rose in the fifth year, and increased almost regularly in the succeeding years. After the tenth year elbow fracture was less common. Nothing is to be added concerning the question of age, for this did not appear to be a factor influencing the result. It should be stated, however, that, in the experience of one of us (H. F. W.), good results from elbow fractures in adults depend even more upon early mobilization and massage than do such results in children. The elbow fracture of an adult, immobilized for a considerable period, is almost bound to be followed by more or less limitation in motion, whereas early movements and massage are just as certain to result in excellent function. The number of elbow fractures in adults in this series is too small to prove these statements.

For our purposes a very simple classification of elbow fractures has been employed:

1. Supracondylar (including diacondylar).
2. External condylar (including capitellum and epicondyle.
3. Internal condylar (including trochlea and epitrochlea).
4. Upper end of ulna.
5. Upper end of radius.

Although not accurate anatomically, this classification is most useful here, because we have not found any difference in results in the various sub-groups. The statistics we have quoted from Ashhurst and others concern fractures of the lower end of the humerus alone, but it was thought desirable to include fractures of the upper end of the radius and ulna in our report.

That the elbow fractures were sent for massage and mobilization from eight different departments was stated in the beginning of this paper. The interval after fracture at which the patients were referred varied considerably with the different departments. Some sent all elbow fractures, others only those cases that did not appear to be doing well with the ordinary methods of treatment. These factors must be considered in the interpretation of the statistics. For, on the one hand, if the chance for a perfect result is increased by having all cases, favorable and unfavorable, come from one source, it is certainly diminished by the comparatively unfavorable elbow fractures derived from another source. The final discharge with a perfect result was made in 53 per cent of our cases; the remaining 47 per cent presented results more or less imperfect. The following is the list of the cases according to the classification already outlined:

	Perfect Result Cases	Imperfect Result Cases
Supracondylar fractures	23	26
Fractures of the external condyle	8	6
Fractures of the internal condyle	12	9
Fracture of the upper end of the ulna	6	5
Fracture of the upper end of the radius	4	1
Total	53	47

This tabulation demonstrates that the chances for cure do not depend, to any great extent, upon the type of fracture. The majority of those fractures grouped under "external condyle" and "internal condyle" entered the joint.

Turning to the question of the relation of perfect results to the period of immobilization of the elbow, our experience was very impressive to us. We found that the outlook for perfect results was by far most favorable when the fractures were immobilized for the briefest period possible, and when massage and mobilization were instituted thereafter, and this is demonstrated by the accompanying table.

	Perfect Result Cases	Imperfect Result Cases
Mobilization and massage begun in first week after injury	27	2
Mobilization and massage begun in second week after injury	19	11
Mobilization and massage begun in third week after injury	6	15
Mobilization and massage begun in fourth week after injury	0	8
Mobilization and massage begun in fifth to eighth weeks after injury	1	11
Total	53	47

The average number of days of immobilization for the group of perfect results was then compared with that of the imperfect results.

A careful calculation showed that the difference was equally striking in all the varieties of fracture. Only the total results will therefore be given: Patients, finally discharged with a *perfect* result, were referred for mobilization and massage at periods averaging *12.8 days* after fracture. Patients finally discharged with an *imperfect* result were referred for mobilization and massage at periods averaging *32.1 days* after fracture.

It was thought important, especially from an economic point of view, to determine the length of treatment by mobilization and massage in relation to the interval after fracture that patients came for this treatment. In estimating this relationship the question of the final outcome was not considered, and ultimately perfect and imperfect results are grouped together. It should be clearly understood, however, that fractures yielding perfect results generally required a much shorter period of massage and mobilization than those yielding imperfect results.

DURATION OF TREATMENT BY MASSAGE AND MOBILIZATION

Duration 15.7 days for fractures immobilized for one week.
Duration 24.5 days for fractures immobilized for two weeks.
Duration 23.7 days for fractures immobilized for three weeks.
Duration 36.0 days for fractures immobilized for four weeks.
Duration 30.1 days for fractures immobilized for five to seven weeks.

In connection with this tabulation it should be stated that the patients in the various week groups were not discharged after 15.7 days, 24.5 days, etc. The figures simply indicate the periods of time during which treatment was found necessary or advantageous. After these periods the patients were permitted to use their elbows freely, and they returned from time to time for control. The decrease in the duration of treatment in the five to eight weeks' group is explained by the fact that the great majority of the fractures of this group yielded imperfect results and the patients were discharged when it was evident that imperfect results were the best to be obtained.

The rôle of hyperflexion in the results obtained will now be considered. Opponents of treatment by early massage and mobilization maintain that reduction of elbow fractures combined with immobilization in hyperflexion yields sufficiently satisfactory results. This is evidently not the case, for the best statistics, those of Ashhurst, give perfect results in only 81 per cent of the cases. It should be indicated that immobilization for several weeks, although strongly urged by Ashhurst, is not absolutely carried out by him. He dresses the injured elbow every third or fourth day; at the dressings "hyperflexion is cautiously diminished just enough to enable the surgeon to bathe the flexure of the elbow and to insert a new piece of lint." This is not, of course, any planned attempt at mobilization; indeed, Ashhurst expressly states that early passive motion of the fractured elbow is equivalent to torture. Although not directly concerned with this paper, it may not be out of place to say that, before combining early mobilization and massage with hyperflexion, one of us (H. N.) treated a series of elbow fractures (not in the statistics of this paper) by immobilization in hyperflexion for periods averaging three weeks. The results were more satisfactory than those previously obtained by fixation in other positions, but by no means entirely satisfactory. Returning to the question of the relation of hyperflexion to the results recorded in our statistics, we now wish to call attention to the fact that the majority (sixteen) of the cases referred for massage and mobilization in the first week after injury, and a number (seven) referred in the second week, were elbow fractures fixed in hyperflexion by one of us (H. N.). *The results were perfect in all the twenty-three cases in which fixation in hyperflexion was combined with early mobilization and massage, with one exception.* The exception was a patient ten years old (Case 24), in whom the lower end of the humerus was very extensively shattered by the injury. This was evident in the physical examination and the X-ray picture. Despite several attempts under anæsthesia, the fragments could not be set in good position. The elbow was fixed in hyperflexion after each of these efforts, and mobilization and massage were begun on the ninth day. The final result is an elbow

considerably deformed, with the full degree and power of flexion, extension to 145°, and a normal carrying angle.

It is, then, as incorrect to state that the position of the elbow is of no importance if mobilization and massage are begun early as to maintain that the position of hyperflexion is satisfactory without early mobilization and massage. The combination of fixation in hyperflexion with early massage and mobilization offers the ideal chance for a perfect result.

Before describing this combined treatment it should be stated that six of the series of one hundred elbow fractures were operated upon. We have studied them only from the viewpoint of result, not that of indication or of technique. A perfect result was not obtained in any of the cases operated upon and subsequently sent for mobilization and massage. How different the results might have been if these patients were not operated upon cannot, of course, be determined; however, we have seen so many satisfactory results from careful non-operative treatment of elbow fractures (even when accompanied by marked displacement of fragments) that we are exceedingly conservative in our indications for operation.

THE RATIONALE AND THE TECHNIQUE OF HYPERFLEXION

From the viewpoint of leverage, the position of hyperflexion for fracture of the elbow is more advantageous than that of flexion in any angle less than the most acute obtainable, or in the position of extension. Although, in the latter position, "the axes of the forearm and arm nearly coincide . . . and leverage for rotation of the humerus is absent . . . the forearm acts as a powerful lever in adducting or abducting the humerus . . . and, if any fracture of the humerus exists, the nearer it is to the elbow the more easily will the position of the lower fragment be influenced by abduction or adduction of the forearm." (*Ashhurst.*) In other words, if the fragments are not in absolute alignment and the forearm is not fixed in an entirely correct relation to the arm, marked distortion of the lower fragment of a fracture of the humerus near the elbow can readily occur. Furthermore, most of the fractures of the lower end of the humerus are oblique, supracondylar lesions. The obliquity is generally downwards and forwards from the extensor to the flexor surfaces. The lower fragment shows a tendency to backward and upward displacement, not only from the contour of the fracture, but also from muscular action. Extension of the elbow may aid and in no way prevents this tendency. Semiflexion of the elbow or flexion less acute than hyperflexion are better positions for correct fixation of the fragment, but *any flexion short of hyperflexion does not abolish the lever action of the forearm.* When the latter exists the slightest adduction or abduction of the forearm may cause marked rotation of the lower fragment of a fractured humerus and it may be an exceedingly difficult problem to control this distortion. In the position of hyperflexion the leverage of the forearm is completely abolished and the distorting influence of the muscles that span the elbow is largely eliminated. Hyperflexion has an additional advantage in respect to leverage. With the elbow in the acutely flexed posture the triceps acts as a natural splint of the lower end of the humerus. It is closely applied to the humerus, covers the extensor surfaces of the condyles, and spreads out beyond the joint in a broad and powerful aponeurosis. This action of the triceps in hyperflexion is one of the greatest advantages of the position, in our opinion.

Hyperflexion is as correct for the maintenance of the carrying angle as it is for leverage. If the carrying angle is distorted as a result of fracture it is well known that the axis of the forearm crosses that of the arm when the elbow is flexed. The argument for immobilizing the elbow in extension to avoid gunstock deformity is invalidated when it is realized that the position of hyperflexion is sustained with the forearm in exact alignment with the arm. The axes of the two coincide; in other words, the carrying angle can be maintained without extending the elbow to determine if there is gunstock deformity.

Finally, it should be added that most of the unfortunate results of fracture of the elbow consist in limitation of flexion. There is no

way of determining in advance what the result of any elbow fracture will be. Limitation of motion in a well-flexed elbow is the least disadvantageous form of limitation. From this viewpoint hyperflexion is also the most desirable position.

The arguments advanced for hyperflexion for supracondylar fracture apply with almost equal force to most of the other fractures about the elbow. It would lead us too far afield to enter into further details; suffice it to state that our statistics show that the results of fracture of the condyles and of the upper end of the radius are as good as those of supracondylar fractures when fixation in hyperflexion is combined with early massage and mobilization.

Before the elbow is placed in hyperflexion all displaced fragments should be reduced. This is possible in the great majority of the cases. In a small but very instructive group of the patients in our series accurate reduction was impossible. They were instances of very complicated comminuted fractures of the lower end of the humerus; the outlook for any other than operative treatment appeared very bad in all these cases. Nevertheless, the results of hyperflexion combined with early massage and mobilization were perfect in all but one case. The latter has already been presented in detail.

The effects of attempts at reduction (general anæsthesia occasionally necessary) should be invariably controlled by radiograms taken immediately after, in order to correct promptly any pronounced displacement that may remain. It may not be out of place to state our firm conviction that the minimal amount of examination commensurate with the establishment of a diagnosis and the setting of a fracture is of the greatest advantage to the patient. We are most strongly opposed to the viewpoint of those who consider it essential to search for crepitus, abnormal mobility, etc., in order to make the examination complete. In not a few instances we have seen fractures impacted in good or fair positions that have done remarkably well by avoiding such a search. Indeed, we ascribe a share of the results in the cases treated by hyperflexion to a minimal amount of trauma inflicted in the examination and the fixation of the injured elbow.

The technique of hyperflexion has already been indicated to some extent. It would take us too far from our subject to discuss the methods of reducing displaced fragments. The fracture having been set by one of these methods, the elbow is placed in hyperflexion. *Hyperflexion does not mean merely acute flexion; it is the most acute flexion in which the elbow can be fixed without obliterating the radial pulse.* Varying with the amount of swelling at the elbow as well as with the muscular and adipose tissue of the arm, the angle at which the joint can be flexed generally ranges between 20 and 35 degrees. It is very remarkable to observe the extreme flexion obtainable in most instances of *recent* fracture. The time for fixation in hyperflexion is not when the swelling at the elbow has receded, but as soon after the fracture as the patient is seen. The best results are unquestionably attained in the most recent fractures.

The forearm is flexed upon the arm with the axes of both coinciding. In Ashhurst's opinion it is immaterial if the forearm is in pronation or in supination. The latter position is preferred by us; we have made it an invariable rule to see that the thumb points directly outwards when the elbow is ready for the bandage. A piece of gauze is placed in the bend of the elbow. For immobilization we have employed Ashhurst's bandage, with a few minor changes, and have found it very satisfactory and most suitable for our purposes. An ordinary roller bandage is used. First bandaging in the hand (leaving the fingers exposed) several turns are taken around the wrist. The lower end of the ulna is protected by absorbent cotton. Drawn firmly, the bandage is carried from the wrist around the upper arm as near the axilla as possible, and is then brought around the wrist again. This circular turn around the forearm and arm is repeated, the turns being carried nearer and nearer the elbow. They are held in place by alternating turns passed about the elbow. Ashhurst finishes the bandage around the neck in order to make a sling for the elbow, but this does not appear advantageous to us.

RATIONALE AND TECHNIQUE OF MOBILIZATION AND MASSAGE FOR FRACTURE OF THE ELBOW

It is not in our province to discuss in detail the general principles upon which early mobilization and massage are based. Although there are the two diametrically opposed schools, the results we have presented clearly demonstrate the practical advantages of the application of the treatment. The end-result of fracture of the elbow depends upon the function of the joint. And the chief object of massage and mobilization is to prevent joint-stiffness, whether dependent upon muscle atrophy, changes in the capsule, or mechanical interference of malplaced fragments of bone. Those opposed to early mobilization of elbow fractures see in its practice the danger of displacement of the fragments and of formation of excessive callus. This fear has proved entirely unfounded in our hands for we have never observed complications by following the simple rules that will be formulated.

The most important principle for early mobilization and massage is that the treatment must be practically painless. The significance of this is readily grasped: well-set fragments cannot be displaced without causing pain. It is, therefore, most essential that massage and mobilization be carried out under the patient's control, the slightest evidence of pain being sufficient to stop the treatment. In our hands this has proved to be the best way to avoid any accidents. The rule is especially important when the treatment is applied to young children. Many of them are thoroughly frightened by the necessary examinations, manipulations, etc., previously carried out, and tend to struggle when mobilization is attempted. If such children can be sufficiently quieted to permit gentle massage near the elbow, a striking change is soon observed. The resisting and struggling child becomes quiet after a few light strokes are applied and the painful spasm of the muscles disappears; in fifteen to twenty minutes painless movements at the elbow can be practiced to a degree utterly impossible before.

The treatments, generally of fifteen to twenty-five minutes' duration, consist, in the beginning, in gentle, stroking massage of the arm, and slight flexion and extension movements at the elbow. At later periods the treatment is more and more vigorously practiced. All sudden movements of the arm are very carefully avoided. The elbow is always supported during treatment and *is fixed in hyperflexion after each treatment.* Massage and mobilization are applied daily in the great majority of the cases. Although massage may be instituted immediately after the injury, an absolute rule for the time to begin mobilization cannot be made. The X-ray picture and freedom from pain in the first trials are the best guides. Mobilization may be tentatively essayed as soon as the fourth or fifth days after the fracture. The earliest attempts should be made when the X-ray pictures show simple or impacted fractures, or small fragments of bone so situated that their healing in place might prove a mechanical hindrance.

Active and passive motions at the shoulder and in the hand are instituted from the outset. In the beginning it is usually impossible for the patient to move the elbow-joint actively. He is nevertheless encouraged to try to do so when passive movements are practiced, for the voluntary efforts aid the passive movements and render them easier of performance. Active motions are really never necessary during the period of mobilization and massage, for function returns so soon that pronounced atrophy rarely occurs. Should there be any, the patient generally uses the arm sufficiently, after two or three weeks, to prevent additional atrophy from disuse.

The length of time that the elbow is kept in the hyperflexion bandage depends upon the union of the fracture and the type of patient. If there is little or no pain and good function has returned to the joint, the bandage can often be omitted after some two weeks, or need be worn only at night. The dressing is rarely necessary for more than three weeks. It should be borne in mind that a lively child, finding the injured elbow free from pain, is prone to use it too carelessly and may even accidentally refracture it. In general, therefore, children require immobilization longer than adults.

REPORT OF CASES

Brief abstracts of the histories will be given. The general grouping of the lesions used in the body of the paper will be employed. In the case reports especial emphasis will be placed upon the periods of immobilization. Mobilization and massage begun within two weeks of the time of fracture will be arbitrarily termed "early," after two weeks, "late." The photographs and röntgenographs have been chosen to illustrate one or more of the typical or unusual cases in each of the subgroups.

SUPRACONDYLAR AND DIACONDYLAR FRACTURES

	Cases
Total number of cases	49
Perfect results	23
Group A — Hyperflexion combined with early massage and mobilization	11
Group B — Immobilization in non-hyperflexed positions, early mobilization and massage	7
Group C — Immobilization in non-hyperflexed positions, late mobilization and massage	5
Imperfect results	26
Group D — Hyperflexion, early massage and mobilization	1
Group E — Immobilized in non-hyperflexed positions, early massage and mobilization	7
Group F — Immobilized in non-hyperflexed position, late mobilization and massage	14
Group G — Operated upon	4

GROUP A

CASE 1. Max B., age 6. Supracondylar fracture of the left humerus, pronounced posterior displacement, on August 24, 1913. Reduction, fixation in hyperflexion for 6 days. Mobilization and massage for two weeks; discharged with normal motion. Examination, April, 1914: Normal flexion and extension, normal carrying angle. Range of motion at elbows: Right, flexion 40°, extension 180°; left, flexion 40°, extension 183°.

CASE 2. Annie K., age 3. Supracondylar fracture of the left humerus with moderate posterolateral displacement, May 7, 1912. Reduction and hyperflexion for one week. Rapid return of function with massage and mobilization. Discharged after two weeks with approximately normal motion. Examination, November, 1912: Normal flexion and extension, normal carrying angle.

CASE 3. Joseph G., age 7. Supracondylar fracture of the right humerus with marked posterior displacement, October 15, 1911. Incomplete reduction under anæsthesia. Hyperflexion for one week, then massage and mobilization. Discharged November 21, with some limitation of motion. Examination, November, 1912: Normal flexion and extension, normal carrying angle.

CASE 4. Sarah C., age 21. Slightly comminuted supracondylar fracture of the left humerus, May 9, 1911. Immobilized in hyperflexion (the full angle was not obtainable, owing to the obese arm of the patient) for one week. Massage and mobilization for two and one-half weeks; discharged with normal motion and normal carrying angle. The latter obtained at a subsequent examination in June, 1911.

CASE 5. Louis F., age 9. Supracondyiar fracture of the left humerus with comminution of the internal portion of the fragment (direct violence), October 17, 1913. Hyperflexion for five days. Massage and mobilization for two weeks, at end of which time motions were nearly normal. Examination, April, 1914: Normal flexion and extension. Motions of both elbows: Flexion 35°, extension 185°. Normal carrying angle.

CASE 6. Morris T., age 13. Supracondylar fracture of right humerus with very slight posterior displacement, June 3, 1913. Hyperflexion for one week, the massage and mobilization. Discharged after three weeks with normal flexion and extension normal carrying angle. The same findings at a subsequent examination later in the year.

CASE 7. Isidor S., age 3. Supracondylar fracture with moderate displacement; April 11, 1911. Hyperflexion for two weeks; mobilization and massage for three weeks, at end of which time flexion was 55°, extension almost complete. Examination in December, 1911: Very slight limitation in flexion, extension complete, normal carrying angle. April, 1914: Normal flexion and extension.

CASE 8. Lena B., age 3. Impacted supracondylar fracture of left humerus, December 17, 1913. Hyperflexion for four days; mobilization and massage for two weeks. Discharged with normal motion and carrying angle. Examination, April, 1914: Normal flexion and extension (35°, 180°, both elbows), normal carrying angle.

CASE 9. Celia P., age 6. Simple supracondylar fracture and fracture through upper end of ulna (right elbow), July 12, 1912. Good position of fragments only after the second attempt to immobilize in hyperflexion. Latter maintained for nine days. Mobilization and massage for two weeks, then discharged with normal function. Examination, April, 1914: Normal flexion and extension, normal carrying angle. Measurements: flexion 30°, extension 185°, of both elbows.

CASE 10. Abraham S., age 14. Comminuted fracture of lower end of left humerus and fracture of head of radius, October 16, 1913. Treated the first two days in the accident room of the hospital. Then immobilized in hyperflexion for five days. Despite the crepitation of numerous fragments palpable on moving the joint, mobilization and massage were begun. Continued for two and one-half weeks, at end of which period motions were approximately normal. Examination, April, 1914: Normal flexion and extension, normal carrying angle. Measurements: Flexion 30°, extension 180°, both elbows.

CASE 11. Abraham D., age 10. Supracondylar fracture of right humerus, slight posterior displace-

ment, October 12, 1913. Hyperflexion for one week. Then mobilization and massage. Discharged with nearly normal motion on November 28, 1913. Examination, April, 1914: Normal flexion and extension (40°, 180°, both elbows), normal carrying angle.

GROUP B

CASE 12. John W., age 5. Supracondylar fracture of left humerus with considerable displacement, March 22, 1911. Three attempts under anæsthesia before an approximately correct reduction was obtained. Mobilization and massage begun April 12th, continued for several weeks. Final examination, May, 1912: Normal flexion and extension, normal carrying angle.

CASE 13. Dora W., age 10. Fissured supracondylar fracture of right elbow without displacement, August 23, 1913. Wet dressings for one week. Mobilization and massage for two weeks. Discharged with normal motion. Examination, April, 1914: Normal flexion and extension (both elbows, flexion 35°, extension 185°). Both elbows show pronounced valgus posture, therefore of no pathological significance.

CASE 14. Mary B., age 9. Incomplete supracondylar fracture of the right humerus without displacement, August 19, 1913. Immobilized in partial extension for 11 days. Mobilization and massage for two weeks, then discharged with normal motion.

CASE 15. Joseph W., age 13. Supracondylar fracture of left humerus with slight posterior displacement, November 8, 1911. Immobilized at right angle for 8 days. Mobilization and massage for several weeks, at end of which time discharged with very little limitation in motion. Examination, April, 1914: Normal flexion and extension, (flexion 40°, extension 185°, of both elbows) and normal carrying angle.

CASE 16. Max R., age 13. Supracondylar fracture of left elbow with very slight displacement, March 14, 1912. First immobilized in extreme flexion for one week, then extreme extension for one week. Mobilization and massage for three weeks, motions then nearly normal. Entirely normal when seen November 15, 1912. Examination, April, 1914: Normal flexion and extension (flexion 40°, extension 180°, both elbows), normal carrying angle.

CASE 17. William L., age 11. Supracondylar fracture, no displacement, October 15, 1912. In plaster for 10 days, then mobilization and massage. Very short period of treatment necessary. Discharged with normal motion in the middle of November. Normal motions again determined in December, 1912, and February, 1913.

CASE 18. Sylvester McC., age 9. Supracondylar fracture of right humerus without displacement, also metacarpal fracture of right hand, June 2, 1913. Immobilized at right angle for two weeks. Mobilization and massage; discharged with approximately normal motion after several weeks. Examination, April, 1914: Normal flexion and extension (flexion 35°, extension 180°, of both elbows) and normal carrying angle.

GROUP C

CASE 19. Gerla K., age 22 months. Supracondylar fracture of left humerus with very little displacement and very marked effusion, August 2, 1912. Wet dressings for two weeks, then plaster for one week. Then mobilization and massage with rapid improvement. Examination, October, 1913: Perfect motion, normal carrying angle.

CASE 20. Lazarus S., age 10. Supracondylar fracture with very little displacement, March 10, 1913. Immobilized in semiflexion for three weeks. Then mobilization and massage for two weeks. Examination, November, 1913: Normal flexion and extension, normal carrying angle.

CASE 21. Esther M., age 6. Impacted supracondylar fracture of left elbow with slight posterior displacement, July 31, 1912. Immobilized for three weeks; then mobilization and massage. Discharged September 24, 1912, with practically normal motion. Examination, April, 1914: Normal motion (flexion 40°, extension 185°, both elbows), normal carrying angle.

CASE 22. Henry R., age 4. Supracondylar fracture of left humerus with very slight anterior displacement, June 8, 1912. Immobilized at right angles for three and one-half weeks. Then mobilization and massage for four weeks, at end of which time flexion was complete, extension to 170°. Examination, November, 1913: Normal flexion and extension, normal carrying angle.

CASE 23. Samuel S., age 4. Supracondylar fracture with moderate anterior displacement, April 27, 1912. In hospital, in semiflexion, for one week. Then in clinic for four weeks, at end of which time mobilization and massage were begun and continued for two weeks. Discharged with slightly limited flexion. Examination, January, 1913: Normal flexion and extension, normal carrying angle.

GROUP D

CASE 24. Timothy C., age 10. Reported in the body of this paper. Extensive comminution of the lower end of the left humerus with anterior displacement of the external half of the epiphysis, October 6, 1913. Accurate replacement of the fragments unsuccessful, despite several attempts under anæsthesia. Operation suggested but not accepted. Hyperflexion for ten days. Mobilization and massage for two months. Discharged with limited extension. Examination, April, 1914: Considerable deformity of lower end of humerus. Normal flexion, pronounced limitation in extension, carrying angle normal in the range of motion. Good power. Measurements: Right, flexion 40°, extension 180°; left, flexion 40°; extension 145°.

GROUP E

CASE 25. Israel W., age 10. Supracondylar fracture of the right humerus without displacement,

September 20, 1912. In moderate flexion for eight days. Mobilization and massage for five weeks, discharged with slightly limited flexion. Examination, April, 1914: Slight limitation in flexion, extension complete. Measurements: Left, flexion 35°, extension 180°; right, flexion 38°, extension 180°.

CASE 26. Isaac Z., age 10. Comminuted epiphyseal fracture of the left humerus, February 28, 1912. Wet dressings for eight days. Then mobilization and massage. Continued for three months, during which period there was very slow improvement. Healing with pronounced deformity of joint. Discharged with flexion 70°, extension 150°. Examination, June, 1913: Enormous deformity of lower end of humerus, moderate valgus, free motion and good power, between 70° flexion and 155° extension.

CASE 27. Samuel T., age 10. Diacondylar fracture of right humerus with moderate displacement, November 10, 1912. In extension for ten days. Then mobilization and massage for two months. Discharged with 60° flexion and 170° extension. Examination in February, 1913, showed a little additional improvement, no outlook for a perfect result. The first X-ray pictures did not appear to show any fracture but pictures taken in January showed an "old diacondylar fracture with faulty union of the fragments."

CASE 28. Jennie S., age 19 months. Supracondylar fracture of the left elbow with considerable displacement, November 12, 1911. Fixed in acute flexion for one week, then at right angles for five days. Mobilization and massage for three weeks; discharged with approximately normal function. Examination, April, 1914: Very marked varus, normal flexion and extension. Measurements of both elbows: Flexion 35°, extension 180°.

CASE 29. Nicholas C., age 26 months. Diacondylar fracture of the left humerus with slight displacement, September 17, 1912. In semiflexion for two weeks. Mobilization and massage for four weeks, at end of which time extension was complete, flexion limited to 70°. Examination, April, 1914: Marked limitation in flexion, extension complete, exceedingly pronounced varus deformity. Measurements: Right, flexion 35°, extension 180°; left, flexion 70°, extension 180°.

CASE 30. John O'L., age 3. Supracondylar fracture of the left humerus with marked rotation of the fragment, August 1, 1912. Fixed at right angles for two weeks, then mobilization and massage. During the latter flexion beyond 90° was never obtainable. Examination, April, 1914: Good power, slight varus deformity, flexion markedly limited by callus on anterior aspect of lower end of humerus, flexion complete. Measurements: Right, flexion 30°, extension 185°; left, flexion 90°, extension 185°.

CASE 31. Sidney K., age 10. Incomplete supracondylar fracture of the left humerus, August 27, 1912. In semiflexion for two weeks, mobilization and massage for six weeks. Result was then considered so unsatisfactory that operation was advised. Case not seen since.

GROUP F

CASE 32. Abraham M., age 5. Supracondylar fracture of the right humerus, very slight displacement, October 24, 1913. First fixed in extension, then in flexion. Mobilization and massage after two and one-half weeks, continued for three months. Examination, April, 1914: Some prominence of callus on anterior aspect of humerus. Slight varus. Pronounced limitation in flexion. Measurements: Left, flexion 35°, extension 180°; right, flexion 85°, extension 185°.

CASE 33. William W., age 6. Diacondylar fracture of right humerus, June 1, 1911. Immobilized at right angles; three weeks later mobilization and massage were begun. After several weeks' treatment flexion was normal, extension to 170°, limited by callus. No outlook for further improvement and patient was therefore discharged.

CASE 34. Moses V., age 5. Supracondylar fracture of the right elbow with considerable displacement, April 25, 1912. In semiflexion for three weeks. Then in the hospital, where *brisément forcé* was practiced in attempt to improve the limited motion. This was subsequently repeated at another institution. Mobilization and massage ineffectual. Examination, December, 1913: Very marked limitation of motion (flexion 95°, extension 165°), extensive deformity of lower end of humerus.

CASE 35. Mary L., age 6. Supracondylar fracture of right humerus, July 20, 1912. In wet dressings for two weeks, then plaster of Paris for two weeks. Then mobilization and massage. When last seen, September, 1912, motion was limited between flexion 70° and extension 170°, and there was no outlook for a satisfactory result.

CASE 36. Fanny S., age 14. Supracondylar and external condylar fracture of left humerus, December 19, 1912. Immobilized in various positions, chiefly extension, for four weeks. Very slow improvement under mobilization and massage of many weeks' duration. Final result was flexion 70°, extension 170°, muscle power fair.

CASE 37. Sarah K., age 5. Supracondylar fracture of right humerus with pronounced displacement, February 4, 1911. Fragment not successfully reduced. Sent for mobilization and massage on March 11. At that time there was a bayonet deformity, flexion limited to 70°, extension to 130° and operative treatment was soon advised. Subsequent fate unknown.

CASE 38. Pietro S., age 7. Left-sided supracondylar fracture with considerable displacement, September 4, 1912. Imperfect reduction, immobilized in semiflexion for four weeks. Then mobilization and massage under which there was steady improvement up to flexion 50°, extension 170°. Examination, December, 1912: Flexion normal, extension 170°, the limitation being due to callus.

CASE 39. Julia G., age 4. Supracondylar fracture of the right humerus with moderate lateral displacement, June 23, 1913. Immobilized for five weeks, first in extension, later in flexion. Musculo-

spiral nerve involvement. Mobilization and massage begun July 31, continued for four weeks. Discharged with some limitation in motion. Examination, April, 1914: No evidence of musculospiral involvement. Very marked varus. Some limitation in flexion, extension complete. Measurements: Left, flexion 40°, extension 180°; right, flexion 47°, extension 180°.

CASE 40. Walter K., age 10. Supracondylar fracture of the right humerus with very slight displacement, October 7, 1913. Mobilization and massage begun after five weeks, continued for four weeks. Discharged with approximately normal motion. Examination, April, 1914: Rather thick callus on anterior aspect of lower end of humerus. Slight valgus deformity. Flexion slightly limited, extension normal. Measurements: Left, flexion 45°, extension 180°; right, flexion 50°, extension 180°.

CASE 41. Harry B., age 6. Supracondylar fracture of right humerus with slight posterolateral displacement, July 2, 1913. Immobilized for six weeks. Mobilization and massage for four weeks. Discharged with the normal range of motion and marked gunstock deformity. Not seen since.

CASE 42. Sarah P., age 16. Dislocation of the right elbow and diacondylar fracture, February 15, 1912. After reduction of dislocation immobilization in various positions for six weeks. Then sent for mobilization and massage with very slight range of motion in joint. Slow improvement in many weeks of treatment. Examination, April, 1914: Very marked valgus, fair power in the very limited range of motion. Measurements: Left, flexion 40°, extension 185°; right, flexion 85°, extension 145°.

CASE 43. Rose L., age 6. Diacondylar fracture of the left humerus with moderate displacement, January 15, 1913. In various positions for two months. Mobilization and massage for six weeks. Discharged with flexion 60°, extension 145°. Examination, April, 1914: Slight valgus, some limitation in flexion and extension. Measurements: Right, flexion 35°, extension 185°; left, flexion 45°, extension 175°.

CASE 44. Hain B., age 9. Supracondylar fracture of right humerus with considerable displacement, June 10, 1913. After immobilization in the hospital for several days, the elbow was manipulated under anæsthesia upon three different occasions in the effort to obtain free motion. When referred for mobilization and massage five weeks after injury, the range of motion in the joint was very small. Moderate improvement under treatment, but end-result very unsatisfactory, motion being very limited, measurements not made.

CASE 45. Jack F., age 14. Supracondylar fracture without displacement. April 19, 1912, immobilized in plaster of Paris for one week. Then manipulated under anæsthesia and immobilized for two weeks. Mobilization and massage with improvement, after several weeks, up to 80° flexion and 160° extension. Examination, April, 1914: Flexion, 60°, extension 160°, poor power.

GROUP G

CASE 46. William F., age 5. Supracondylar fracture of the left humerus with moderate displacement, July 3, 1913. Fixed at right angles for two weeks. Mobilization and massage for two weeks with little improvement in the range of motion. Operation, July 29, 1913, at which the fragment on the anterior aspect of the humerus, interfering with flexion, was removed. Thereafter, immobilization in flexion. Mobilization and massage after two weeks. When last seen, October 20, 1913, extension was almost normal, flexion limited to 90°.

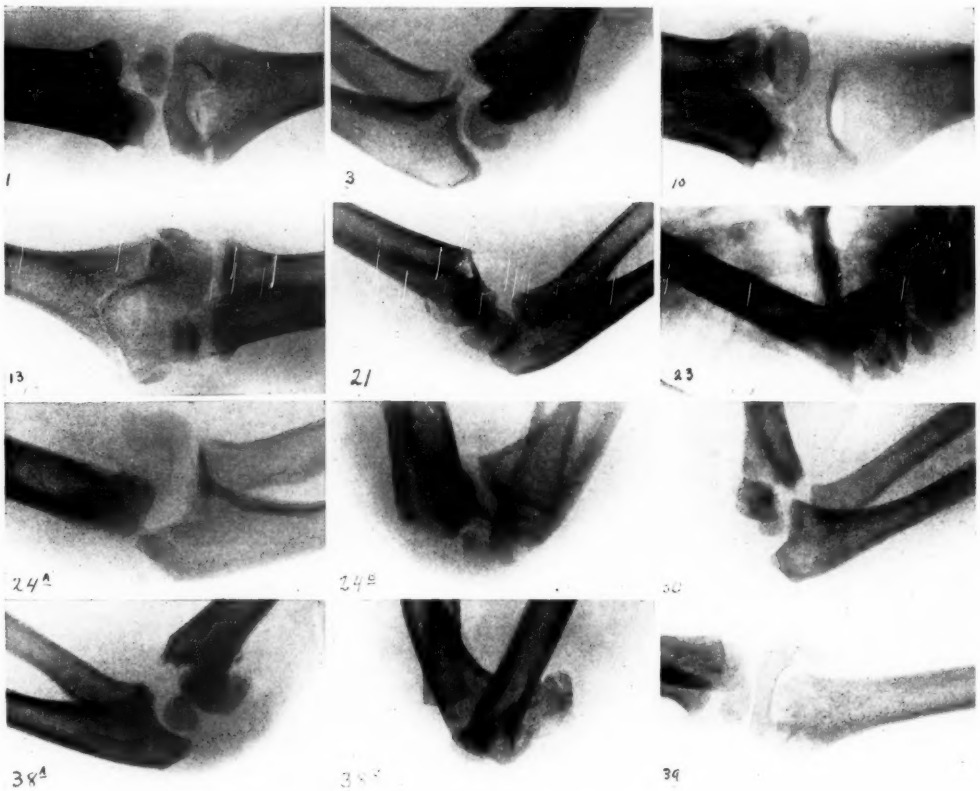
CASE 47. William F., age 9. Supracondylar fracture of the right humerus with marked displacement, August 15, 1913. Treated conservatively at first, result unsatisfactory, operated upon September 20, 1913. Fragment reduced and nailed. Massage and baking started in hospital soon after, continued in the clinic. February, 1914: Marked limitation in motion — flexion 85°, extension 170°.

CASE 48. Morris D., age 9. Supracondylar fracture of the left humerus with marked displacement, July 1, 1913. Immobilized for four weeks at another institution. Thereafter, very marked limitation in motion. *Brisement force* in the hospital, September 11, 1913. Slight improvement in motion. Operation, October 14, 1913: Reduction and nailing of fragment. Examination, April, 1914: Flexion, 100°, extension 130°, fair power. Extensive deformity of lower end of humerus.

CASE 49. Joseph N., age 7. Supracondylar fracture of left humerus with moderate displacement, Aug. 13, 1913. In partial extension for ten days. Non-reduction. Sent to hospital for operation. Fragment of bone obstructing flexion removed. Mobilization and massage begun ten days later, continued for six weeks. Examination, April, 1914: Power only fair, moderate valgus. Moderate limitation in extension, pronounced in flexion. Measurements: Right, flexion 40°, extension 180; left, flexion 65°, extension 175°.

FRACTURES OF THE INTERNAL CONDYLE AND EPITROCHLEA

	Cases
Total number of cases	21
Perfect results	12
Group A — Hyperflexion, early mobilization and massage for fracture of internal condyle	4
For fracture of epitrochlea	1
Group B — Immobilization in non-hyperflexed positions, early mobilization and massage, for fracture of internal condyle	4
Fracture of epitrochlea	2
Group C — Immobilization in non-hyperflexed position, late mobilization and massage	1
Imperfect results	9
Group D — Immobilization in non-hyperflexed positions, early mobilization and massage, for fracture of internal condyle	3
Fracture of epitrochlea	3
Group E — Immobilization in non-hyperflexed positions, late mobilization and massage, for fracture of internal condyle	2
Fracture of epitrochlea	1



Figures shown in illustration are case numbers.

Fig. 1. Case 1, Group A. Four days after injury.
Fig. 2. Case 3, Group A. Seven weeks after incomplete reduction of supracondylar fracture. Perfect result.
Fig. 3. Case 10, Group A. Two days after injury.
Fig. 4. Case 13, Group B. Two days after injury.
Fig. 5. Case 21, Group C. The day of injury.
Fig. 6. Case 23, Group C. Six days after injury. Complete reduction was not obtained.
Fig. 7. Case 24-A, Group D. The day following the injury. Comminuted fragments indistinctly seen.
Fig. 8. Case 24-B, Group D. The last day of hyperflexion.
Fig. 9. Case 30, Group E. The day after injury. Marked rotation of the fragments.
Fig. 10. Case 38-A, Group F. Two days after injury.
Fig. 11. Case 38-B, Group F. Six days after injury. Imperfect reduction.
Fig. 12. Case 39, Group F. One month after injury.

GROUP A

CASE 50. Morris C., age 11. Comminuted fracture of internal condyle and trochlea of left humerus, June 1, 1913. Immobilized in hyperflexion two days after injury. Mobilization and massage begun on June 10th. Discharged on July 31st, with normal motion. Examination, April, 1914: Normal flexion and extension, correct carrying angle, bone contour normal. Measurements: Flexion of 40°, extension of 180°, both elbows.

CASE 51. Alex E., age 10. Fracture and downward displacement of right internal condyle, September 13, 1913. Hyperflexion for six days. Mobilization and massage for three weeks. Approximately normal motion at time of discharge. Examination, April, 1914: Normal flexion and extension. Slight valgus of right elbow, but the same on non-fractured side and therefore of no pathological significance. Measurements: Left, flexion 40°, extension 185°; right, flexion 40°, extension 180°.

CASE 52. Marcus G., age 12. Fracture of the internal condyle of the right humerus without displacement, January 5, 1914. Hyperflexion for nine

days. Mobilization and massage; discharged well on February 14th. Examination, April, 1914: Normal flexion and extension, normal carrying angle. Measurements: Left, flexion 40°, extension 185°; right, flexion 37°, extension 180°.

CASE 53. Harry P., age 8. Fracture of the internal condyle of the left humerus with very little displacement, June 5, 1912. Treated elsewhere for several days. Elbow found stiff and in poor position. Good position obtained under anæsthesia, and joint fixed in hyperflexion (June 17th). Elbow swollen to a very marked degree. Nevertheless mobilization and massage were begun on June 22d. Steady improvement from the beginning. Examination, December, 1913: Normal flexion and extension, normal carrying angle, fair power. Circumference of the joint 2 cm. greater than the normal side.

CASE 54. Ida G., age 8. Separation and posterior displacement of the left epitrochlea, July 7, 1913. Reduction, fixation in hyperflexion for one week. Mobilization and massage; discharged on July 28 with slightly limited flexion. Examination, April, 1914: Normal flexion and extension, normal carrying angle. Measurements: Right, flexion 40°, extension 190°; left, flexion 38°, extension 180°.

GROUP B

CASE 55. Max L., age 9. Fracture and lateral displacement of a small portion of the internal condyle, October 18, 1912. Immobilized in partial extension for one week. Mobilization and massage for three and one-half weeks; discharged well. Examination, April, 1914: Normal motion and carrying angle. Measurements: Flexion 40°, extension 185°, of both elbows.

CASE 56. William M., age 34. Fracture and moderate displacement of internal condyle, left humerus, November 14, 1913. Fixed in flexion for one week, mobilization and massage for three weeks. Rapid improvement in motion. Discharged with normal flexion and extension, normal carrying angle.

CASE 57. Charles L., age 8. Comminuted fracture of internal condyle of the right humerus with slight displacement of the fragments, December 2, 1911. Mobilization and massage begun on December 11th. Discharged with nearly normal motion December 27th. Examination, January, 1913: Normal flexion and extension, normal carrying angle.

CASE 58. Fanny L., age 9. Simple fracture of the right internal condyle, August 6, 1913. Immobilized in semiflexion for two weeks. Mobilization and massage for four weeks; discharged with normal function. Examination; April, 1914: Normal motion and carrying angle. Measurements: Left, flexion 40°, extension 180°; right, flexion 40°, extension 185°.

CASE 59. Max G., age 12. Fracture-displacement of right epitrochlea, August 10, 1913. Immobilized in partial extension for nine days. Mobilization and massage for two weeks, discharged in good condition. Examination, April, 1914: Slight prominence in region of internal condyle. Normal motion and carrying angle. Motions of both elbows range between 40° flexion and 185° extension.

CASE 60. Bertha F., age 24. Fracture of right epitrochlea with slight displacement, November 18, 1913. Immobilized in semiflexion for one week, mobilization and massage for ten days. Normal range of motion and carrying angle, as determined one month later.

GROUP C

CASE 61. August H., age 16. Fracture of the right internal condyle with very slight displacement, March 27, 1912. Immobilized for three weeks, then mobilization and massage. Discharged with the normal carrying angle and range of motion, May, 1913.

GROUP D

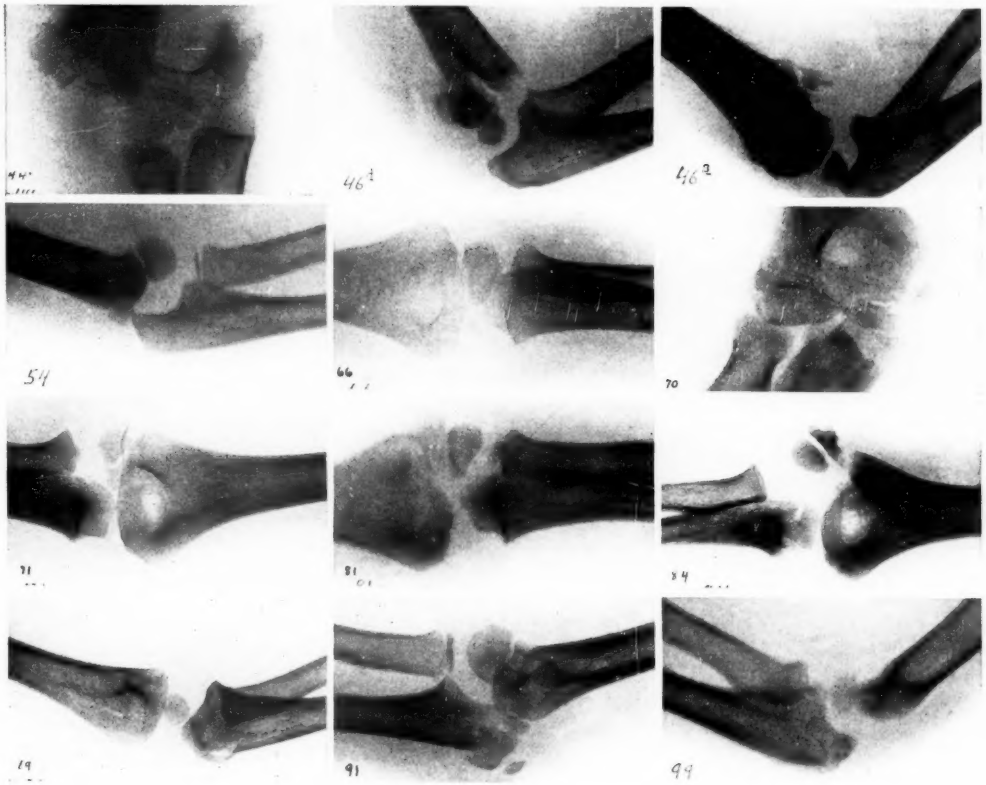
CASE 62. William B., age 8. Detachment of the right internal condyle, September 8, 1911. Fragment imperfectly reduced. Immobilized in semiflexion for one week. Mobilization and massage for three months, a short interim in which adhesions were broken up under anæsthesia. Discharged with somewhat restricted motion. Examination, April, 1914: Slight valgus, slight limitation in flexion and extension. Rather good power. Measurements: Left, flexion 35°, extension 180°; right, flexion 38°, extension 178°.

CASE 63. Ida W., age 13. Fracture of internal condyle April 1, 1913. Came for treatment one week later. Immobilized in semiflexion for one week. Mobilization and massage for four weeks. Discharged with almost normal flexion, extension to 175°, very marked valgus.

CASE 64. Harry S., age 10. Infraction of right internal condyle November 10, 1913. X-ray at first thought negative and case treated as sprain in accident room of hospital. When transferred to the clinic, ten days after injury, flexion and extension were markedly limited and the internal condyle was very sensitive. A second X-ray showed the lesion. Referred for mobilization and massage, under which improvement was steady. Examination, May, 1914: Fullness over the anterior aspect of the internal condyle. Pitches ball well. Some limitation in flexion and extension, carrying angle normal. Measurements: Left, flexion 38°, extension 180; right, flexion 45°, extension 175°.

CASE 65. Isidor C., age 8. Separation of right epitrochlea, January 23, 1913. In partial extension for nine days, then mobilization and massage disappeared from observation on February 10th. Motion then ranged from 90° in flexion to 170° in extension. Although incompletely followed, the case is included here because it can be definitely stated that there was no outlook for a perfect result.

CASE 66. Max S., age 8. Fracture and marked displacement of the right epitrochlea, November 18, 1913. Bandaged for 11 days; large and painful



Figures shown in illustration are case numbers.

Fig. 13. Case 44, Group F. Two weeks after injury.
Fig. 14. Case 46-A, Group G. The day of injury.
Fig. 15. Case 46-B, Group G. One month after operation.
Fig. 16. Case 54, Group A. The day following injury.
Fig. 17. Case 66, Group D. Eleven days after injury.
Fig. 18. Case 70, Group E. Eleven days after injury.
Fig. 19. Case 71, Group A. The day of the injury.
Fig. 20. Case 81, Group D. Ten days after injury. Deformity seen here in the early stage remained permanent.
Fig. 21. Case 84, Group F. Twelve days after injury.
Fig. 22. Case 89, Group A. Five days after injury.
Fig. 23. Case 91, Group B. The day of the injury.
Fig. 24. Case 99, three weeks after fracture. Note slight deformity in the healing of the radius.

effusion in the elbow-joint. Mobilization and massage for three weeks, discharged with imperfect result. Examination, April, 1914: Considerable limitation in flexion, carrying angle normal. Measurements: Left, flexion 40°, extension 180°; right, flexion 75°, extension 185°.

CASE 67. Louis S., age 16. Simple fracture of left epitrochlea, May 3, 1913. In extension for six days, then mobilization and massage; very slow improvement; treatment continued for three months. Examination, April, 1914: Very slight valgus, moderate limitation in flexion. Measurements: Right, flexion 45°, extension 180°; left, flexion 55°, extension 180°.

GROUP E

CASE 68. John R., age 10. Fracture of internal condyle and impacted fracture of the neck of the radius (left elbow), July 4, 1912. In extension for three weeks. Mobilization and massage very ineffectual, owing to joint adhesions (?). *Brisément forcé* on August 27th. Thereafter mobilization and massage were somewhat more effective. When last seen, October, 1912, there was considerable limitation in flexion and extension.

CASE 69. William G., age 12. Fracture of the right internal condyle without displacement, November 1, 1913. Immobilized for three weeks; then mobilization and massage. Discharged Decem-

ber 3d, motion approximately normal. Examination, April, 1914; slightly limited flexion, extension normal, carrying angle normal. Does heavy work without discomfort. Measurements: Left, flexion 50°, extension 180°; right, flexion 55°, extension 180°.

CASE 70. Gussie A., age 12. Fracture of the epitrochlea and trochlea of the left humerus, August 30, 1912. Immobilized in partial extension for three weeks, mobilization and massage for 7 weeks; discharged with imperfect result. Examination, April, 1914: Slightly limited flexion, moderately limited extension, moderate valgus. Measurements: Right, flexion 60°, extension 180°; left, flexion 63°, extension 140°.

FRACTURE OF THE EXTERNAL CONDYLE

	Cases
Total number of cases	14
Perfect results	8
Group A — Hyperflexion, early mobilization and massage	3
Group B — Immobilization in non-hyperflexed positions, early mobilization and massage	3
Group C — Immobilization in non-hyperflexed positions, late mobilization and massage	2
Imperfect results	6
Group D — Immobilization in non-hyperflexed positions, early mobilization and massage	3
Group E — Immobilization in non-hyperflexed positions, late mobilization and massage	2
Group F — Operated upon	1

GROUP A

CASE 71. Thomas G., age 7. Fracture of the external condyle of the left humerus, internal displacement of fragment and capitellum, September 20, 1913. Hyperflexion for one week, then mobilization and massage. Discharged October 10th, with normal motion. Examination, April, 1914: Normal flexion and extension and carrying angle. Measurements: Right, flexion 50°, extension 185°; left, flexion 50°, extension 180°.

CASE 72. David Z., age 11. Fracture of right external condyle, August 16, 1913. Treated elsewhere (in extension) for one week. Fragment found displaced downwards and inwards. Reduction under anæsthesia, hyperflexion for one week. Slow improvement under mobilization and massage. Discharged with approximately normal motion, October 16th. Examination, April, 1914: Some fullness in region of external condyle. Normal carrying angle, flexion, and extension. Measurements: Flexion 35°, extension 180°, of both elbows.

CASE 73. Moritz K., age 8. Fracture and slight displacement of the left external condyle, February 25, 1911. Hyperflexion for one week, mobilization and massage for two and one-half weeks. Discharged with nearly normal motion. Examination, April, 1914: Normal flexion and extension and carrying angle. Measurements: Flexion 35°, extension 185°, of both elbows.

GROUP B

CASE 74. Milton T., age 8. Fissured fracture of the right external condyle, September 1, 1912. Splint for one week, mobilization and massage for three and one-half weeks. Discharged with normal flexion and extension. The same findings when examined in December, 1912.

CASE 75. Joseph R., age 6. Fracture without displacement of the right external condyle, June 24, 1913. Immobilized in partial extension for nine days. Mobilization and massage for ten days, after which the patient was discharged. Examination, April, 1914: Some prominence in the region of fracture. Normal flexion, extension, and carrying angle. Flexion 30°, extension 180°, of both elbows.

CASE 76. Ruby S., age 4. Fracture of surgical neck and infraction of the external condyle of the right humerus, September 15, 1913. Immobilized for two weeks. Mobilization and massage for a short period; discharged with normal motions at the shoulder and elbow-joints.

GROUP C

CASE 77. Morris A., age 6. Fracture of the right external condyle, September 1, 1911. Immobilization for three weeks. Mobilization and massage for two weeks; discharged with a perfect result. Latter obtained when last seen, October 15, 1911.

Fig. 25. Case 1, Group A. Perfect result. Supracondylar fracture of left humerus.

Fig. 26. Case 5, Group A. Perfect result. Comminuted supracondylar fracture of left humerus.

Fig. 27. Case 9, Group A. Perfect result following supracondylar fracture and fracture through the upper end of the ulna. Right elbow.

Fig. 28. Case 13, Group B. Perfect result. Fissured supracondylar fracture of right elbow.

Fig. 29. Case 24, Group D. Marked limitation in extension following comminuted fracture of the humerus.

Fig. 30. Case 25, Group E. Slightly limited flexion of right elbow after simple supracondylar fracture.

Fig. 31. Case 28, Group E. Very marked varus after supracondylar fracture of left elbow. The immediate result appeared very good.

Fig. 32. Case 29, Group E. Markedly limited flexion and very pronounced valgus after simple diacondylar fracture.

Fig. 33. Case 32, Group F. Marked limitation in flexion and slight varus after supracondylar fracture of right humerus with very little displacement.

Fig. 34. Case 39, Group F. Very marked varus and somewhat limited flexion after incompletely reduced supracondylar fracture.

Fig. 35. Case 40, Group F. Slight valgus and limited flexion after simple supracondylar fracture right humerus.

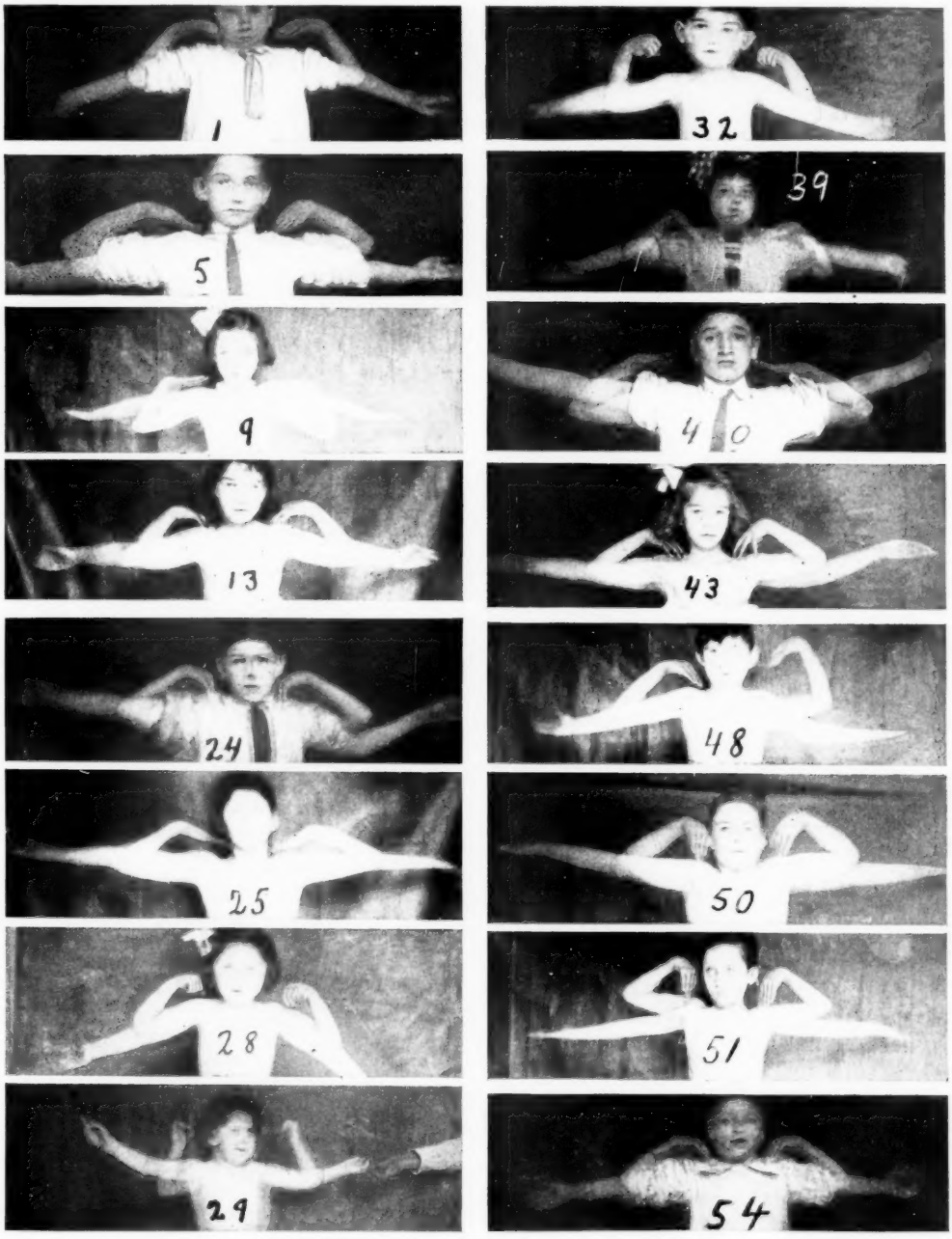
Fig. 36. Case 43, Group F. Slight valgus, somewhat limited motions following moderately displaced supracondylar fracture.

Fig. 37. Case 48, Group G. Exceedingly limited motions after operation for supracondylar fracture.

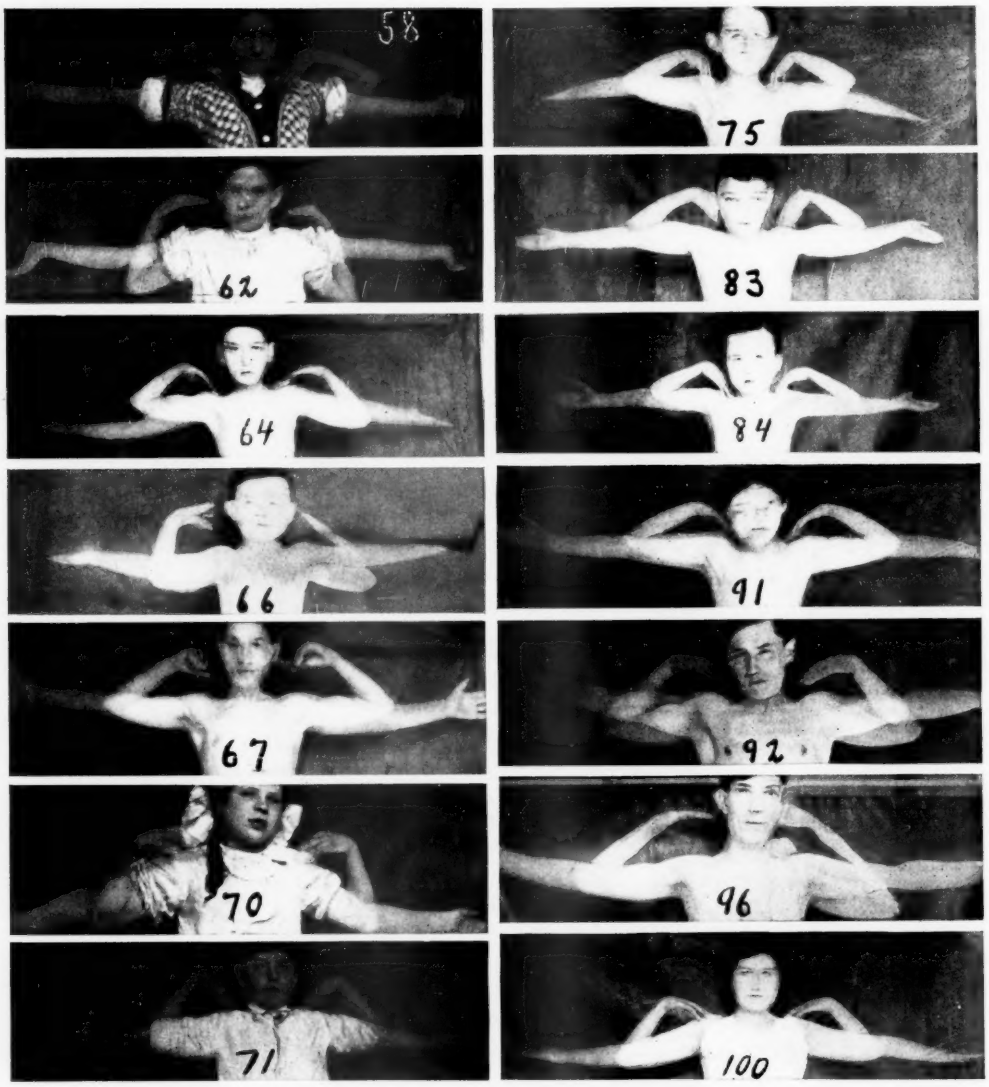
Fig. 38. Case 50, Group A. Perfect result. Comminuted fracture of internal condyle and trochlea left humerus.

Fig. 39. Case 51, Group A. Perfect result after fracture-displacement of right internal condyle.

Fig. 40. Case 54, Group A. Perfect result. Separation of the left epitrochlea.



Legends on opposite page. Figures shown in illustration are case numbers.



Figures shown in illustration are case numbers.

Fig. 41. Case 58, Group B. Perfect result after simple fracture of the right internal condyle.

Fig. 42. Case 62, Group D. Slightly limited motion and valgus after imperfectly reduced fracture of the right internal condyle.

Fig. 43. Case 64, Group D. Limitation in motion following simple infraction of the right internal condyle.

Fig. 44. Case 66, Group D. Considerably limited flexion following fracture-displacement of the right epitrochlea.

Fig. 45. Case 67, Group D. Moderately limited flexion and slight valgus, simple fracture left epitrochlea.

Fig. 46. Case 70, Group E. Limited extension and valgus following fracture of the epitrochlea and trochlea of the left humerus.

Fig. 47. Case 71, Group A. Perfect result. Fracture and internal displacement of the external condyle.

Fig. 48. Case 75, Group B. Perfect result. Fracture of the right external condyle.

(Legends continued on opposite page.)

CASE 78. Meyer H., age 11. Comminuted fracture of the left external condyle, August 15, 1911. Immobilized for three weeks, mobilization and massage begun six weeks after the injury. Discharged October 31, 1911, with absolutely normal motion.

GROUP D

CASE 79. Alex. H., age 5. Incomplete fracture of the external condyle of the right humerus, June 20, 1913. Immobilized in extension for 10 days, mobilization and massage for four weeks. Discharged with some limitation of motion. Examination, April, 1914: Slight limitation in flexion and extension, normal carrying angle. Measurements: Left, flexion 35°, extension 185°; right, flexion 40°, extension 178°.

CASE 80. Morris K., age 8. T-shaped fracture of the left external condyle, February 25, 1911. Discharged April 1, 1911, with somewhat limited motion. Examination, April, 1914: Slightly limited flexion and extension, normal carrying angle. Measurements: Right, flexion 35°, extension 185°; left, flexion 38°, extension 178°.

CASE 81. Louis C., age 4. Fracture of the right external condyle with marked anterolateral displacement, June 23, 1913. In partial extension for two weeks, then mobilization and massage. Last examination, October 15, 1913: Full extension and flexion, moderate varus deformity, excessive callus at site of fracture.

GROUP E

CASE 82. Rose B., age 2. Fracture of the left external condyle, June 4, 1912. Mobilization and massage begun five weeks later, continued for nine weeks before a fair functional result could be obtained. Examination, April, 1914: Slight deformity in contour at the external condyle. Carrying angle normal. Slight limitation in flexion and extension. Measurements: Right, flexion 35°, extension 185°; left, flexion 40°, extension 178°.

CASE 83. Hyman D., age 8. Fracture and moderate displacement of the left external condyle, August 1, 1911. After immobilization for five weeks there was very marked limitation of motion. *Brisément forcé* on October 25th. Mobilization and massage begun October 31st, continued for two and one-half months, discharged with motion ranging between 55° flexion and 170° extension. Examination, April, 1914: Moderate limitation in flexion and extension, normal carrying angle. Measurements: Right, flexion 35°, extension 185°; left, flexion 42°, extension 175°.

GROUP F

CASE 84. William W., age 5. Fracture of the left external condyle with considerable displacement, and of the left olecranon with very slight displacement, June 18, 1913. After immobilization for ten days, operation, the displaced fragment being removed. Mobilization and massage begun soon after. Discharged after several weeks' treatment with somewhat limited extension. Examination, April, 1914: Considerable deformity of the humerus in the region of the external condyle. Moderate valgus. Normal flexion and extension (flexion 35°, extension 180°, of both elbows).

FRACTURES OF THE UPPER END OF THE ULNA

	Cases
Total number of cases	11
Perfect results	6
Hyperflexion cases	0
Group A — Immobilization in non-hyperflexed positions, early mobilization and massage	6
Imperfect results	5
Group B — Immobilization in non-hyperflexed positions, early mobilization and massage	2
Group C — Immobilization in non-hyperflexed positions, early mobilization and massage	2
Group D — Operated upon	1

GROUP A

CASE 85. Robert K., age 43. Fracture of the coronoid process of the right ulna, October 13, 1913. Immobilized for three days, then mobilization and massage. Discharged October 31st, with practically normal motion. Examination, April, 1914: Normal flexion and extension and carrying angle. Measurements: Flexion 45°, extension 180°, of both elbows.

CASE 86. Louis H., age 11. Fracture near the upper end of the left olecranon, July 23, 1912. In extension for one week, then mobilization and massage. Discharged August 10th, with approximately normal motion. Examination, April, 1914: Normal flexion and extension (flexion 40°, extension 180°, of both elbows), normal carrying angle.

CASE 87. Samuel B., age 5. Fracture of the right olecranon with very slight displacement, October 27, 1911. Extension for one week, mobilization and massage for five weeks; discharged with normal motion. Not seen subsequently.

CASE 88. Moses Z., age 14. Comminuted fracture of the tip of the left olecranon, February 1, 1913. Extension for one week, mobilization and massage for three weeks, discharged with perfect motion. Examination, April, 1914: Normal motion (flexion 35°, extension 180°, of both elbows) and carrying angle.

CASE 89. Ben W., age 4. Incomplete fracture of the left olecranon, May 24, 1913. Partial extension for ten days, mobilization and massage for two weeks; discharged with normal motion. Examination, April, 1914: Normal motion and carrying

Fig. 49. Case 83, Group E. Moderately limited motions following fracture-displacement of the left external condyle.

Fig. 50. Case 84, Group F. Normal motion, moderate valgus, following operation for fracture-displacement of the left external condyle.

Fig. 51. Case 91, Group B. Normal motion, slight varus, following fracture through upper end right ulna.

Fig. 52. Case 92, Group B. Slightly limited motions following fracture of the tip of the right olecranon.

Fig. 53. Case 96. Perfect result. Comminuted fracture of the head and neck of the left radius.

Fig. 54. Case 100. Slightly limited flexion following fracture through the head of the right radius. This is the best result seen after *brisément forcé*.

angle. Measurements: Right, flexion 35°, extension 185°; left, flexion 35°, extension 180°.

CASE 90. Abraham S., age 8. Impacted fracture of the left olecranon with slight posterior displacement, April 25, 1912. Extension for 12 days, mobilization and massage for one week. Examination, April, 1914: Normal motion (flexion 35°, extension 180°, of both elbows) and carrying angle.

GROUP B

CASE 91. Mary L., 8 years old. Fracture through the upper end of the right ulna with some displacement, March 14, 1913. Extension for ten days, mobilization and massage for 5 weeks. Examination, April, 1914: Normal flexion and extension (flexion 35°, extension 185°, of both elbows). Slight varus.

CASE 92. George S., age 22. Fracture and upward displacement of the tip of the right olecranon, November 14, 1912. Extension for two weeks, mobilization and massage for two weeks. Examination, April, 1914: Slightly limited flexion and extension. Small bony mass in the triceps immediately above olecranon. Measurements: Left, flexion 40°, extension 185°; right, flexion 45°, extension 178°.

GROUP C

CASE 93. Rubin J., age 14. Fracture of the right olecranon, March 3, 1911. Extension for three weeks. Mobilization and massage for three and one-half weeks; discharged with almost perfect motion. Examination, April, 1914: Slight hollow one inch below the tip of the olecranon. Some limitation in flexion. Measurements: Left, flexion 35°, extension 185°; right, flexion 43°, extension 180°.

CASE 94. Thomas McK., age 16. Fissured fracture of the left olecranon, February 15, 1911. Extension for four weeks, then free use of the elbow for three weeks. Result unsatisfactory; referred for mobilization and massage. Motion then was flexion to 90°, extension to 150°. Some improvement under mobilization and massage, but, when last seen, in May, 1911, motion was still markedly limited and result considered very unsatisfactory.

GROUP D

CASE 95. Samuel P., age 45. Fracture of the olecranon, June 10, 1912. Operation (at another institution), with suture of the displaced fragment. Immobilized in extension for five weeks. Motion then between 110° and 170°. Some improvement during several weeks' mobilization and massage. Patient discontinued treatment; no probability of a very satisfactory result.

FRACTURES OF THE UPPER END OF THE RADIUS

	Cases
Total number of cases	5
Perfect results	4
Hyperflexion, early mobilization and massage	3
Semiflexion, early mobilization and massage	1
Imperfect result	1
Semiflexion, late mobilization and massage	1

CASE 96. Benjamin B., age 24. Comminuted fracture of the head and neck of the left radius, October 30, 1913. Well reduced by hyperflexion; the position maintained for five days. Mobilization and massage despite the considerable effusion in and around the joint. Discharged well after four weeks. Examination, April, 1914: Normal flexion and extension, normal carrying angle. Measurements: Flexion 40°, extension 180°, of both elbows.

CASE 97. Sam L., age 21. Fracture of the neck of the left radius, May 18, 1913. Immobilized in hyperflexion on May 20th. Mobilization and massage begun May 27th. Discharged with normal motion, June 12th. Examination, April, 1914: Full flexion and extension, normal carrying angle. Measurements: Right, flexion 50°, extension 180°; left flexion 45°, extension 180°.

CASE 98. Ben F., age 9. Fracture through the neck of the right radius, August 6, 1913. Accurate reduction by hyperflexion. The position maintained for nine days. Mobilization and massage for ten days. Discharged with normal motion. Examination, October, 1912: Normal flexion and extension. Flexion 35°, extension 185°, of both elbows.

CASE 99. Samuel P., age 5. Impacted fracture of the neck of the radius and fracture of the olecranon with slight displacement (right elbow), September 20, 1911. Semiflexion for six days. Mobilization and massage for three weeks, at end of which time motion was approximately normal. Examination, November, 1911: Normal flexion and extension, normal carrying angle.

CASE 100. Fanny F., age 16. Fracture through the head of the right radius, December 12, 1911. Immobilized for two weeks at another institution, for three additional weeks at the clinic. *Brisément forcé* for the very pronounced limitation of motion on January 18, 1912. Mobilization and massage begun immediately after, continued through February, when the patient was discharged with some limitation of motion. Examination, April, 1914: Some limitation in flexion, normal carrying angle. Measurements: Left, flexion 35°, extension 180°; right, flexion 40°, extension 180°.

CONTRIBUTION TO THE CURE OF CANCER OF THE UTERUS BY CURETTING FOR DIAGNOSIS[1]

By H. J. BOLDT, M.D., F.A.C.S., New York

BEFORE presenting for your consideration the details of the case which induced me to address you on the subject chosen, permit me to give what are practically a few extracts concerning the pathology of cancer — particularly of uterine cancer — from the work of Schottländer and Kermauner. And I may add for the benefit of those interested in the subject that the book written by our colleague, Dr. Thomas S. Cullen, is without equal in the English language.

Schottländer and Kermauner's classification is as follows:

Cancerous tumors with typical epithelial arrangement,

Pavement epithelium — cancroids,

High adenomatous cylindrical cell cancer (malignant adenoma) and

Tumors with atypical epithelial arrangement.

The cancer or carcinoma simplex.

Solid cancer. Nests filled solidly with epithelium (in the tissue). Primary solid carcinomata never take a glandular character.

Pavement epithelium cancer is divided into ripe, middle-ripe, and unripe. The individual nests are called ripe when distinctly crenated cells are present; middle-ripe and unripe when crenation is absent, it being immaterial whether cornification is present or not. Between middle-ripe and unripe or immature nests we differentiate in the sense that in the middle-ripe a larger number of polygonal, even well-defined cells are present; whereas in the unripe, they show no cornification, the small round or elongated formed, or irregularly formed elements being in preponderance.

Fabre, Domergue and Bard, and Borst have also accepted a similar division.

It is advisable to divide carcinoma of the uterus into primarily solid (secondarily, occasionally glandular-like) and into primarily glandular (secondarily, frequently solid) carcinoma. The primarily solid carcinoma are subdivided into ripe, middle-ripe, and unripe without consideration as to the duration of the disease, taking into consideration only the morphology of the nests; and under "ripe" those forms are included which give the principal characters of pavement epithelium.

The primarily glandular carcinomata occur very seldom in the form of pure glandular formations with single layer epithelium—adenoma malignum—usually superimposed layers are formed in addition, whereby solid nests may form secondarily.

These glandular carcinomata, the so-called adenocarcinomata, in which originally the glandular type is well marked, and to which also the papillary form belongs, one may contrast with the carcinoma glandulare, in which by primary filling of the glandulum, the glandular character becomes soon obliterated. Both forms combine and in an advanced stage cannot be differentiated.

The primarily solid carcinomata are most frequently unripe, seldom ripe. The remainder of scirrhous cancers, in contrast with the non-scirrhous, is small. The primarily solid carcinomata are more often medullary than scirrhous; more often but little stroma is recognized between the nests, rather than a large quantity.

A very important point is made by Lubarsch, with which the greater number of authoritative pathologists coincide. Lubarsch states it is impossible for him to diagnose cancer, no matter by what method, until there are positive and clear signs of the destruency of the growth. He says that he is aware that gynecologists ask more and believe that they can accomplish more; but as a matter of fact only a probability can be assumed, unless evidence of destruency is present. Just as Virchow said many years ago, it is maintained by Ponfick, Ribbert, Borst, Albrecht, Henke, Herxheimer, Lewin, and many others, that a more or less complete identity exists between normal cells

[1] Read before the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 16, 1914.

Fig. 1. Microphotograph of section of scrapings removed two weeks after curetting by Dr. Ladinski.

and those of incipient cancer. Not a single investigator has been able to demonstrate a carcinoma, just beginning, without the criticism of subjective interpretation.

So long as experimentation leaves us so obstinately in the lurch, we are still compelled as formerly to rely on experience, to draw conclusions from those cases invariably recognized by all as cancer, to convey these conclusions to the beginning of the disease, and by this means in general, or in the individual case, to reconstruct the diagnosis of the respective early stage.

By this again a subjective moment enters into the discussion, so that a definite conclusion need not soon be expected even in this small chapter of the cancer question.

Still, we cannot fully endorse the resignation of Lubarsch, concerning the diagnosis of cancer in all instances when no destruent growth is present. It is a further question in which stage recognition is possible, if there are specific morphological criteria for a beginning carcinoma — a question which is generally rejected.

The time is past when changes in the epithelium, particularly when an ingrowth of the latter is shown, may be indiscriminately designated as cancer. With the aid of clinical observation, on the basis of experimentation, it has been proved that such occurrences may take place in entirely cancer-free uteri and uteri remaining free of cancer. The main distinguishing reliance is placed upon the formal character of the cells and nuclei. The absence of mitoses and the typical arrangement of the epithelium are dwelt upon by Aeri. In suspicious carcinoma there is irregularity of the cells in size and form, as well as large nuclei rich in chromatin. And Schauenstein speaks of the poor staining of the protoplasm and eosinophilia.

Attention is called to the superimposing of the epithelia in which the epithelia lying inward sometimes take on clubshapes, and in which, occasionally, large nuclei are present in the so-called or genuine pregnancy glands, and which may easily lead to the diagnosis of cancer; so that in some pictures a diagnosis must be refrained from, because only normal cell formations may be present.

It is quite easy to recognize a glandular carcinoma after the type of adenoma malignum with atypical superimposed layers of epithelium (so-called adenocarcinoma) or a papillary glandular carcinoma, but the distinction may become very difficult if the chief characteristic feature of malignant adenoma—single-layer epithelium—remains.

But now let us take another point of view, strictly from the standpoint of the clinician where a positive diagnosis is withheld although a beginning malignant adenoma cannot be excluded. From my point of view, I would advise a vaginal hysterectomy in such a case, unless there were *very* important reasons to keep the patient under further observation, and then this should be done on the patient's responsibility.

It is certain that there are no specific morphological criteria for the recognition of the first-forming carcinoma-cells. On the other hand, it seems possible in some instances of cancer, where there is an absence of destruent growth, to make the correct diagnosis even if the epithelium is still *in situ*.

We must emphasize not only the atypical direction of the growing but rather the faultiness of structure. We are of the opinion that

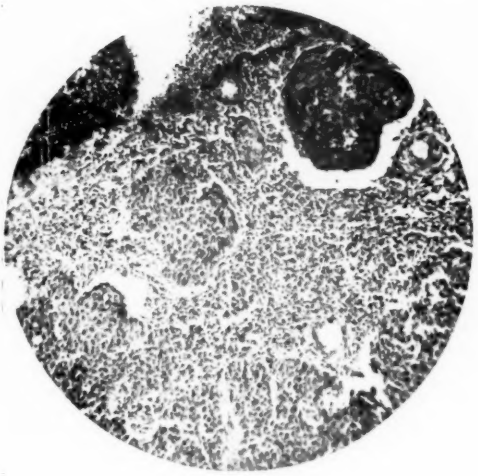


Fig. 2. Alveolar cancer.

Fig. 3. Shows invasion of cancer into muscularis.

especially in the earliest stages the faulty structure is particularly marked, especially in primarily solid, less so in primarily glandular (secondary solid) carcinomata, and this facilitates recognition.

To obtain an opinion, one must know the morphologic, physiologic, and formal qualities of the parent cells. Also the clinical data, the macroscopic appearance, and the direction of the sections must be considered.

A surface growth alone of cancer of the uterus, in the sense that only the mucosa is affected, is very rare; but still it may occur, in the primarily solid, as well as in the primarily glandular, carcinomata. (Case recently seen cited at conclusion.) Cullen says that solid carcinomata penetrate more rapidly into the depth than the glandular; but in our opinion this may vary.

We have not observed the proliferation of glands into lymphatic vessels, and in case of glandular carcinomata in a histological sense, such proliferation is likely to be long delayed.

The propagation of cancer to the uterus by the lymphatics from the parametria is not as exceptional as is generally taught. The deformation of the uterus is important.

While it is possible to ascertain, in the greater number of cases, whether a carcinoma has its primary seat in the corpus or in the collum, this does not apply to the distinction between cervix and portio cancer.

Among the solid cancers the immature, which occur more frequently, are more malignant than the others. This holds good for the large and medium sized tumors. In the latter, the adjoining structures are affected one-third less often.

A collum carcinoma, if somewhat advanced — when the question of a pure malignant adenoma may be excluded — cannot, as a rule, be distinguished from a corporal cancer by microscopical examination, because the cervical epithelium loses its original characteristics and resembles the corporal epithelium.

A clinical factor ascertained by local examination is that infiltrated parametria may be free from cancer, whereas yielding, soft parametria may be carcinomatous. But stress must be laid on the presence of small parametric lymph-nodules, which may be found carcinomatous in otherwise free connective tissue.

The vagina is involved in from 40 to 50 per cent of all cases, but not necessarily in its superficial surface, but lymphatically. Hence the necessity to try to extirpate not less than the upper one-third of the vagina.

One must not be led entirely by the palpa-

tory findings for an indication for a radical operation, because, as already noted, seemingly unfavorable cases may be free from later recurrences. When the abdomen is opened, one can form a better opinion.

An exceptionally important clinical deduction may be made from the careful pathological studies of cancer by Schottländer and Kermauner in the fact that all small cancers were within the compass of laceration-ectropium in the neighborhood of the external cervical orifice.

The following case forms the basis for my contribution.

In November, 1913, a woman, 47 years old, presented herself for examination. She had been married twenty-two years, and had never been pregnant. During the past two years she complained of the usual symptoms accompanying the climacterium. She asserted that she had been menstruating at intervals of four weeks.

(It was learned later that there had been some irregular bleeding for some time, and that she had had a small cervical polypus removed by a physician, which, however, did not stop the irregular loss of blood, which is frequently seen, too, at the climacterium.)

Her complaint at the time of consultation was: extreme weakness; pain in the right lower abdomen; frequent urination and marked nervousness. Pelvic examination showed nothing abnormal, and rested on a diagnosis of mild cystitis — limited principally to the trigonum — and neurasthenia. She then told me that she was desirous of knowing whether she had cancer because she was told that this had been diagnosed from curettings that had been procured from her. A careful intra-uterine exploration failed to find any evidence of an abnormal endometrium. Still, to be on the safe side, another curetting was done very thoroughly by me about two weeks after the original diagnostic curetting; and from the scrapings serial sections were made and a very large number were examined by a very competent pathologist, Dr. Victor Neujean, a pupil of von Recklinghausen, and later pathologist at the Gynecological Department of the University of Munich, and still later to the Imperial Frauenklinik at Berlin. Nothing indicative of malignancy was found, as may be seen in Fig. 1.

Later an opportunity was given me to see the sections upon which the diagnosis of cancer was based through the courtesy of the pathologist who examined them. No material or other sections had been retained by him to permit further study. From the section it is evident that cancer was present in them (see Fig. 2); moreover, from the appearance shown in Fig. 3, it is obvious that the cancer was not in an early stage, as it showed a fairly deep invasion of the muscularis. It was because of this well-advanced carcinoma that the several pathologists of international reputation, among others, Wm. H. Welch and Thomas S. Cullen, of Baltimore; Schottländer, of Vienna; and Jonathan Wright, of New York, who had seen these various sections, expressed it as their opinion that the scrapings in all probability did not come from the same patient, but that a mix-up of specimens had occurred. Against this, however, was the positive statement of the pathologist.

But to make doubly sure, another curetting was done by me about three months subsequent to the first curetting; and again the findings were absolutely negative. The endometrium had not even regenerated in all places, so thorough was my previous curetting done. The question of a polypoid growth in the uterine cavity was negated; hence we had a straight ordinary adenocarcinoma of the body of the uterus.

If we accept the assurance of the pathologist that no error in specimens could possibly have occurred, this is undoubtedly the first case of this character on record, so far as published cases are concerned. But I should like to hear an expression of opinion from the members of this society, some of whom undoubtedly must have had a large experience.

In the November meeting of the Section of Obstetrics and Diseases of Women of the New York Academy of Medicine, Dr. J. L. Ladinski read a paper on this subject and gave a review of cases bearing on this theme; and in this he included the case cited by me (Dr. Ladinski's Case 2, see p. 330). While his review was interesting, it had no bearing on the particular instance cited by me (Ladinski's Case 2) since that case (the one cited by me as forming the basis for my address) was not analogous to any other one published. All cases ever cited (excepting the case mentioned by me — Ladinski's Case 2) were *early* cancers.

Now, Schottländer, in his report to me in connection with that case, says that he could conceive of the possibility of the cancer having been radically removed, if he knew how the curetting was done. That is, if it were done with particular thoroughness over the cancer area. My information is, however, that an ordinary curetting was done, without any particular effort to do it especially deeply, or over any particular area.

I assert that I do not believe that we have any reason to speak of the spontaneous cure

of cancer. All alleged cases of spontaneous cure of cancer are, in my opinion, due to a misconception. There is not a single known case in a human subject, in which the cancer has retrograded spontaneously, in which it did not later show metastases or recurrences. According to von Heisemann (1) the spontaneous cure of cancer belongs to the realm of medical superstition. If Theilhaber (2) expresses the opinion that spontaneous cure occurs more frequently than is thought, the opinion is probably based on non-knowledge of facts. It happens occasionally that a small metastasis retrogrades without leaving a trace; but it happens more frequently that metastatic carcinoma-cells become tumors. Sooner or later recurrences will take place. The recurrence may be very soon, or it may be after many years. In some instances, twenty years or more elapse. By internal medication it has been impossible to cause typical carcinoma to disappear. Small neoplasms, for instance of the face, are occasionally made to disappear by arsenical therapy; but even though these neoplasms show carcinoma-like structure, it is doubtful to some that they are really carcinoma. Carcinomata and sarcomata are cured only when their cells are completely destroyed.

After labor (3), Winter and Ruge, (4) Schottländer and Kermauner (5), and others say that the carcinoma of the uterine body always begins in the mucous membrane, and permits, according to the extension of the primarily affected part, a division into the following three pictures:

1. *Diffuse carcinoma*, a uniform affection of the entire corporal endometrium.

2. *Circumscribed carcinoma*, an invasion of a circumscribed area of the corporal endometrium, leaving the remaining parts of the endometrium free from affection.

3. *Polypoid cancer*, a very circumscribed area, with or without pedicle, arising from the uterine mucosa in the shape of a polypus, which may fill the uterine cavity, and by further growth may distend it. Such polypoid carcinoma is soft, is friable and disintegrates at its surface, whereas its dissemination into the depth is negligible. The remaining part of the mucosa is normal, only at times inflamed. The growth of the neoplasm takes place into the uterine wall or toward the uterine cavity. All carcinomata which have a tendency to develop toward the uterine cavity are less prone to infiltrate the uterine wall, whereas those that extend into the uterine wall rarely form marked neoplasms in the uterine cavity (4).

In my opinion, these pictures of carcinoma, accepted and described by all authors, must be looked upon as very important in connection with the possible cure of carcinoma by curetting. The acceptance of the definition of the original local origin is important.

The cancer begins locally. According to Carl Ruge, cancer of the body of the uterus begins most frequently either with atypical and irregular proliferation of the gland-tissue without primary superimposing and irregular papillary proliferation of the epithelium of the utricular glands (genuine adenocarcinoma). Those early carcinomatous stages always begin in the mucosa and, as Carl Ruge says, one not infrequently has an opportunity to see these early stages when doing a diagnostic curetting, when they have not yet passed the boundaries of the mucosa. There are polypoid proliferations of the mucosa, in which alone the carcinomatous origin has been demonstrated, separated from the organ proper by perfectly normal layers of tissue. In such cases the cancer may be radically obliterated by thorough curetting with a sharp instrument.

Carl Ruge cites such a case, in which after hysterectomy it was impossible to find further evidence of carcinoma in the uterus. The diagnosis had been made by him from diagnostic scrapings of such polypoid proliferation of the uterine mucosa. The carcinoma was sharply limited to this polypus. The remaining parts of the mucosa that were seen and studied in the specimen were nearly normal, and certainly not suspicious.

In the case that was described by P. Prym (6) the conditions were similar. It concerned a woman, 49 years of age, who had complained for three months of atypical bleeding and putrescent leucorrhœa. Because, clinically, suspicion of carcinoma existed, a diagnostic curetting was done. The curetted material

consisted of many mucous membrane-shreds, among which was a larger formation, about the size of a small hazel-nut. This showed, histologically, a typical adenocarcinoma, whereas the remaining particles were free from suspicion of carcinoma. Extirpation of the uterus was done eight days later.

To the astonishment of the author, it was a myomatous uterus about which not a trace of carcinoma was found; even the numerous parts of the uterine wall were examined histologically. The patient remained well. The author admits that in this case it must be accepted that the carcinoma was entirely removed by the curetting. One may deduce, however, from the shape of the piece removed, that it was a small carcinomatous polypus, so that the possibility of complete obliteration by curetting becomes understandable. A third case, according to von Heisemann, was seen by Koblanck. In the case of that patient it did not concern a polypoid cancerous proliferation, but a pavement-epithelium carcinoma of the uterine body. After extirpation of the uterus it was impossible to find any further evidence of carcinoma. The endometrium of the somewhat enlarged uterus was in a normal condition throughout in so far as it was not removed by the curetting. This form of carcinoma is rare and always begins on the superficial surface of the mucosa with metaplastic transformation of the superficial epithelium.

A fourth case is described by Heis (7). The patient was 41 years old and for three months complained of irregular bleeding with leucorrhœa of foul odor. After curetting, the diagnosis of adenocarcinoma was made by Privy-Councillor von Heisemann. But because the sister of the patient had succumbed to a hysterectomy for cancer of the uterus, a radical operation was declined. Nothing further was done, and after the lapse of some time the patient returned for reëxamination. The uterus had decreased in size and the suspicious manifestations (bleeding and leucorrhœa) had disappeared. Now, after three years, the patient is still healthy, and may be considered cured, at least clinically. But here, a repeated histological examination has not proved that the patient is also cured anatomically. No one can say whether, in this instance, we may not have a latent stage of carcinoma, which, according to Brettschneider (8) and Fromme (9), may occur. Only the future can decide this question. At all events, so far as concerns this case, Prym believes that it concerned only a very circumscribed carcinomatous polypus, and that probably the special anatomical conditions made the complete removal of the carcinomatous tissue intelligible.

It is not possible to compare these cases with the one related by me. The sections which I examined and had examined absolutely do not show the early stages, which according to Ruge and Prym, make a complete eradication by curetting intelligible. It did not concern a carcinomatous degeneration of a polypoid proliferation that was limited to the mucosa, because, as the sections show beyond doubt, the carcinoma had penetrated deeply into the myometrium. What may occur in special anatomical disposition is not conceivable in our case. For this reason, I express as my belief that, if no accidental mix-up happened with the specimens, this is the first case of such a nature that has ever been observed.

As subsequent clinical and pathological examinations showed, the patient is cured, not only clinically, but also anatomically; and inasmuch as we cannot speak of a spontaneous cure in cancer we must assume that the carcinomatous structure was removed entirely by curetting, unless an accidental interchange of scrapings occurred. The patient was last seen in November, 1914, and was then in perfect health, subjectively and objectively.

Since seeing the case reported in the foregoing I have had the opportunity of seeing an instance of early adenocarcinoma in a patient in whom no suspicion of cancer was present. The curetting was done in the course of operations for descent of the uterus and vagina.

B. McC., 36 years old, descensus of uterus and vagina. The scrapings were sent to the laboratory, as is done in nearly every instance. The report showed the presence of adenocarcinoma. In view of the extensive plastic operation and the ventral

suspension, I hesitated to subject her to the extirpation of the uterus, but the microscopical pictures were so unmistakable that, upon advice, I yielded without doing another curetting for diagnosis. Serial sections from all parts of the uterine mucosa failed to show further evidence of malignancy.

Pathological report by Victor Neujean:

Specimen consists of the uterus removed by total hysterectomy with both adnexæ. The mucous membrane of the organ does not show macroscopically any suspicion of malignancy. The mucosa presents a few circumscribed areas of hyperæmia; these congestive and hyperplastic processes seem to be more marked in the tubal corners. Microscopical examination. In order to discover any trace of malignant growth, practically the whole mucosa was examined microscopically. Generally speaking the uterine mucous membrane is somewhat thickened and shows slight hyperplasia of the interstitial cells and some hyperplasia and hypertrophy of the uterine glands, the number of which does not seem to be much increased. In some places the interstitial changes and the hyperplastic changes of the glands are more marked, especially in the tubal corners. But, although in those regions the glands are numerous and show some irregularity in the disposition of the epithelial cells, nothing suggestive of malignancy could be found, the glandular individuality being perfectly maintained throughout. The myometrium is dense in texture and shows marked new formation of connective tissue with corresponding decrease in the number of the epithelial cells. The walls of the blood-vessels are thickened by new growth of connective tissue, especially in the intima. Diagnosis: Chronic metritis and endometritis.

BIBLIOGRAPHY

1. VON HEISEMANN. Deutsche med. Wchnschr., 1913, No. 26.
2. THEILHABER. Zentralbl. f. Gynäk., p. 355; Deutsche med. Wchnschr., 1907, No. 26.
3. GEBHART. Pathologische Anatomie der weiblichen Sexual-organs. Berlin, 1899.
4. G. WINTER and C. RUGE. Lehrbuch der Gynäkologischen Diagnostik, Third edition. Leipzig, 1907.
5. SCHOTTLÄNDER and KERMAUNER. Zur Kenntnis des Uteruskarzinoms. Berlin, 1912.
6. P. PRYM. Vollstaendige Entfernung eines Carcinoma Uteri durch Probeauskratzung. Deutsche med. Wchnschr., 1913, No. 26.
7. HEIS. Heilungennes Falles von Carcinoma Uteri nach Probeauskratzung. Deutsche med. Wchnschr., 1913 No. 22.
8. BRETTSCHNEIDER. Beitrag zur Frage der Heilbarkeit des Krebses durch palliative Behandlung. Arch. f. Gynäk., xcii, No. 1.
9. FROMME. Arch. f. Gynäk., lxxix, No. 1.
10. THOMAS. S. CULLEN. Cancer of the Uterus.

OVARIAN TUMORS IN PREGNANCY[1]

WITH REPORT OF A CASE OF A SOLID TUMOR

BY W. C. DANFORTH, B.S., M.D., F.A.C.S., EVANSTON, ILLINOIS
Surgeon to Evanston Hospital

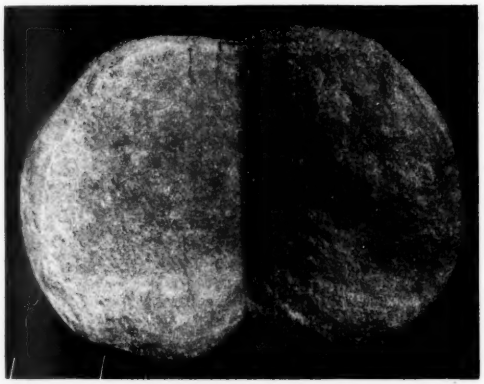
DURING the summer of 1913, a woman aged 32, pregnant about three months, was sent to the writer. Upon examination there was found on the left side of the abdomen a mass apparently about the size of a fœtal head, hard, and freely movable. The fundus of the uterus was easily palpable about two fingers' breadth above the pubis. She stated that five months earlier she had noticed a mass in the lower part of the abdomen which she said had gradually increased in size. There had been a slight bleeding about one week before the patient was seen. A diagnosis was made of ovarian cyst accompanying pregnancy and operation was advised. Laparotomy was done September 9 and the tumor excised. It was easily removed, as there were no adhesions and the tumor was attached to a pedicle about four inches long. The mass weighed 292 grams. It was 10.5 cm. long by 8.5 cm. broad and 6.5 cm. thick. It was of an elongated spheroidal shape and white in color. The consistency was firm and hard. The surface was covered by a firm glistening thin capsule. The cut surface was even and homogeneous, some tiny spaces being seen which were probably due to the dropping out of small particles of tissue which had undergone myxomatous degeneration.

Microscopically, the mass proved to be a fibromyoma which had undergone myxomatous degeneration. One portion of the mass was composed of almost pure unstriped muscle tissue. The patient made an uneventful

[1] Read before The Chicago Gynecological Society, December 18, 1914. (See discussion p. 373.)

ful recovery, left the hospital and was lost sight of. Nothing has been heard of the subsequent labor, but as the woman was in her third pregnancy and the former labors had been normal, it is supposed that it presented nothing out of the ordinary.

Upon looking up the literature it appeared that solid tumors of the ovary are not at all common and that they are particularly rare in connection with pregnancy, as is of course the truth with any type of ovarian tumor. It therefore seemed not unjustified to report the case and at the same time to enter into a brief discussion of the relationship of these tumors to pregnancy. With the exception of a few of the more important articles, the bibliography accompanying this article includes only the titles appearing since 1903, in which year McKerron's paper was published. Since that date there has been no systematic search of the literature.



Ovarian tumor. Elongated spheroidal in shape, white in color.

FREQUENCY

As to the frequency of the occurrence of these tumors, we find in the literature the results of the inquiries of several investigators. Fehling found in 17,832 deliveries only 20 cases of ovarian tumor. Lohlein found 2 cases in 13,000 pregnancies. McKerron estimates the usual frequency to be about one in 1,500 pregnancies. William E. Swan of Johns Hopkins made a most thorough search of the literature from 1861 up to the time of the publication of his paper in 1898 and was able to find only 14 undoubted cases of solid tumor. McKerron, in 1903, in what is probably the most exhaustive publication upon this subject in English, bases his paper upon a series of 1,290 cases of which the character of the tumor may be stated with reasonable certainty in 862. Of these, fibromata or solid adenomata were present in only 19 cases, or slightly over 2 per cent. Dermoids were present in almost a quarter of his cases. The greater frequency of dermoids he ascribes to the fact that they are for the most part small and give rise to no symptoms until the trauma of pregnancy or labor causes some complication. Swan found solid tumors to be a little more frequent than McKerron, as his statistics show them to be present in 6.8 per cent. Jetter in 166 cases found 6.6 per cent solid ones. Puech and VanVerts state that solid tumors are found in 2.5 per cent of the cases of ovarian tumor in pregnancy, thus agreeing with McKerron. While the figures in various reports vary somewhat, it still remains that solid tumor is an infrequent accompaniment of pregnancy. I found no case of bilateral fibroid tumor of the ovary during pregnancy.

INFLUENCE OF TUMOR ON PREGNANCY

In the great majority of cases it may safely be said that the progress of the pregnancy will not be materially influenced. Ovarian tumors are removed at present as a rule before they attain a size which will be sufficient to cause any symptoms attributable to pressure. Even today, however, occasional cases are reported which are an exception to this rule. Torsion of the pedicle is an occurrence which is observed with fair frequency. It may be said in general that this complication is found about three times as often in ovarian tumors associated with pregnancy as in those found apart from that condition. McKerron found sixty cases of torsion in his series and states that he believes it to happen in one out of eight cases. Torsion is much more apt to occur in tumors situated in the abdomen than in those occupying the pelvic cavity.

Torsion of the uterus, to which Schultze

drew attention in 1898, is perhaps more common than is usually believed. McKerron finds six cases and quotes Schultze as having seen several cases in which the twisting was as great as 180 degrees. The circulation of the uterus may be disturbed to a sufficient extent by the more marked degrees of torsion to bring about abortion.

Very large tumors predispose to abortion, nature apparently taking this means of relieving the intra-abdominal pressure. Cases have been seen, however, in which, after delivery, the remaining tumor mass was so large that the abdomen had apparently not decreased.

DIAGNOSIS

There seems to be no way in which a solid tumor may be distinguished from a cystic one. The hardness and lack of fluctuation may suggest the presence of a non-cystic mass, but these are so difficult of determination that little reliance may be placed upon them and the diagnosis of solid tumor will, as a rule, be made after opening the abdomen. Small tumors may give no symptoms whatever and the discovery of their presence be made first by a vaginal examination at the time of labor. The tumors are often recognized with great ease, especially early in pregnancy by their rounded form and movability by which they may be differentiated from the uterus which lies in the middle of the abdomen. If the tumor lies behind the uterus, or if it be an intraligamentous one, the differentiation from retroflexed gravid uterus or from tubal pregnancy may be difficult. The question as to whether a given tumor is ovarian or a uterine fibroid of the gravid uterus is in some cases a very difficult one to decide. The ovarian mass is more movable and may fluctuate. Ovarian fibromata are often accompanied by ascites. The uterine fibroid will usually move with the uterus. The more close connection of the uterine tumor with the uterus will be demonstrated by pulling down the cervix as suggested by Schroeder. In the case of an ovarian fibroid its distinction from a uterine fibroid is sometimes very difficult. Free fluid in the peritoneal cavity may suggest an ovarian growth in cases of doubt.

An ovarian tumor in the pouch of Douglas in the early months may simulate a retroflexed pregnant uterus. One of the most valuable signs here is the direction of the cervix. In the retroflexed uterus, this will be directed forward and upward while in the case of a tumor in Douglas' pouch the direction is unchanged although the level of the os externum may be changed by the crowding upward of the uterus. Pelvic exostoses may be confused with tumors lying in Douglas' pouch but rectal examination will usually enable one to exclude this condition.

Floating kidney may simulate ovarian tumor during pregnancy, but this will happen so rarely as to be of little practical importance.

PROGNOSIS

The prognosis as to the mother in cases of ovarian tumor associated with pregnancy depends largely upon the location of the tumor, the promptness with which it is recognized and upon the skill of those by whom she is to be attended. The influence exercised by a small tumor or even in many cases by a large one upon the course of the pregnancy is frequently very slight. During the pregnancy the complication most to be feared is twisting of the pedicle. These cases, however, almost always may be saved by prompt operation. McKerron refers to 64 cases of torsion of the pedicle of which 52 recovered, many of which were relieved by operative interference. The size of the tumor is of much less importance than its location, and the advice which may be given by practitioners poorly informed upon the subject to treat a small tumor expectantly is often very ill founded. Indeed, a small tumor is more apt than a very large one to occupy the pelvic cavity and become an obstruction to labor if allowed to remain till term.

The most rapidly fatal of accidents during pregnancy is rupture. If the cyst be one which has suppurated, the danger becomes exceedingly great. It must also be observed that pregnancy seems to favor suppuration in ovarian cysts. It may be expected, and this fact should be taken into account when formulating a decision as to the course to

pursue in a given case, that twisting of the pedicle, rupture, suppuration, or suppuration and rupture may be expected to happen in about one out of four cases and that no period of pregnancy is more exempt from such accidents than another. It must, therefore, be remembered by those who see these cases that the life of the woman is endangered throughout the entire pregnancy by the presence of the new growth. As McKerron says, the danger lies mainly in the complications to which such growths are liable, and early recognition constitutes the greatest safeguard. The prognosis for the mother in whom the tumor is diagnosticated and removed at once is very good, her operative risk being scarcely, if at all, greater than the risk assumed by a woman undergoing the same procedure in the non-pregnant condition. The chances for the child are also immensely improved by the removal of the mass which might cause great obstruction to labor.

TREATMENT

The proposition may be stated at once that if an ovarian tumor is recognized during pregnancy the proper mode of procedure is its immediate removal. The danger to the mother is slight and the risk to the fœtus is greatly lessened. During the early half of the nineteenth century the treatment of this condition confined itself to the management of the case after labor began, there being but little done to ameliorate the condition during pregnancy. Labor was induced in those cases in which the location or size of the mass rendered it probable that it might become an obstruction to labor. Very large cysts were tapped, it being found that tapping was no more dangerous during labor than at other times. The first operation for the removal of an ovarian tumor undertaken with the full knowledge that pregnancy existed was done by Sir Spencer Wells in 1869. This operation was done upon a woman whose ovarian cyst had ruptured at the end of her third month of pregnancy. The woman recovered and went to term.

In 720 of McKerron's series of cases the condition was allowed to remain until pregnancy terminated. Of these, 152 women died and this mortality would have been greater if in some of the cases operation had not been done during labor or immediately thereafter. Thirty per cent of the children perished.

Spencer says that during the first half of pregnancy all ovarian tumors should be removed, wherever their situation and whatever their size. He states an exception in the case of bilateral tumors causing no symptoms in a patient who is childless, or if operation be done, part of one ovary should be left behind. During the second half of pregnancy all large ovarian tumors and ruptured, inflamed, and strangulated tumors should be immediately removed. "Small tumors which are in the abdomen or which can be easily pushed up out of the pelvis in the knee-chest or Trendelenburg position should be watched, and, if no untoward symptoms arise, be removed at the end of pregnancy or toward the end of the first stage of labor or after delivery." The writer would be rather more radical than Spencer and would incline to the removal of any ovarian growth at the earliest practicable time after its discovery, herein agreeing with E. P. Davis.

Removal by means of an abdominal incision is usually the method of preference, although a few writers, notably Dührssen, urge the vaginal route. Bandler believes vaginal celiotomy to be contra-indicated in the presence of a pregnant uterus. Martin uses a posterior colpotomy in small tumors lying low in the pelvis, removing large ones by laparotomy. The percentage of abortion seems to be much more favorable in the cases subjected to laparotomy than in those subjected to vaginal section, for E. P. Davis finds the interruptions of pregnancy caused by the latter mode of attack to amount to 49 per cent. In a series of 284 cases of ovariotomy collected by Flatau in 1907, abortion followed in only 17 per cent. Wähmer gives the abortion rate as 22.4 per cent. The maternal mortality is scarcely greater during pregnancy than at any other time. According to Dsirne it is 5.9 per cent, to Wähmer, 5.45 per cent, to Vinay, 4.09 per cent to Orgler, 2.7 per cent, and Gräfe gives it as only 2.3 per cent. When one contrasts the

above figures with McKerron's statement that 21 per cent of the cases in his series which were not interfered with but were allowed to go to term died, it does not seem that there can be any hesitation as to the proper course to pursue.

The operation should consume the minimum of time and every care should be taken that the uterus and appendages be not traumatized. The writer does not agree with the statement of Davis made in 1911 as to the value of chloroform as an anæsthetic in these cases, believing that the recent investigations as to the destructive influence of this drug upon the parenchymatous organs render it peculiarly unfit for use in the pregnant woman.

Williams and Hirst believe that in cases in which the tumor remains unrecognized until the last month of pregnancy the removal of the tumor should be followed immediately by a supplementary cæsarean section to relieve the woman of the additional strain of labor soon after a major operation. This mode of procedure was adopted by the writer in the case of a primipara of 39 who was exceedingly anxious to save her babe, her pregnancy having occurred after twelve years of marriage.

In those cases which are not seen until the woman is in labor the treatment depends largely upon the condition of the patient when first seen. If the case has been handled in any but the most aseptic manner the tumor should be pushed up out of the pelvis if possible and delivery accomplished either spontaneously or operatively through the vagina. Delivery by forcefully extracting the child alongside the mass should never be attempted. If reposition be impossible, puncture, or incision and drainage of the tumor if it be a cystic one should be done, after which delivery should be accomplished as speedily as possible and the sac should be removed by abdominal incision or colpotomy within twenty-four hours. If the case be a clean one in a well conducted hospital, the mass may be removed at once by laparotomy and delivery accomplished by hysterotomy or from below at once. In cases in which labor has not begun or in which there is little or no dilatation, the writer inclines to delivery by cæsarean.

The writer would urge that all pregnant women be subjected to careful routine examination during pregnancy, preferably early, in order that ovarian masses, if present, may be detected in time to permit operation at the time of greatest safety. The treatment of this condition may be briefly summarized as follows:

1. Ovarian tumors are not particularly common during pregnancy, but enough cases are on record to make it essential that they be systematically looked for.

2. Operation should be done as early as possible, preferably during the early months of pregnancy, the operation being demonstrated to be very safe for the mother and the danger of abortion being but a fraction greater than the danger of abortion in the cases treated expectantly and less than the danger to the child in those allowed to go to term unrecognized.

3. In case of complication, twisting of the pedicle, rupture of the cyst, or suppuration of the cyst, operation must be done at once.

BIBLIOGRAPHY

AUDEBERT, J. Ovariotomy during pregnancy. Compt. rend. Soc. d'obst., de gynec. et de pædiat. de Par., 1904, vi, 213.

BIRCHER, E. Sarcoma of the ovary during pregnancy. Zentralbl. f. Gynäk., 1907, xxxi, 1378.

CHAVIGNY, C. Surgery of pregnancy complicated by pelvic tumors. N. Orl. M. & S. J., 1909 and 1910.

COUDERT, E. Pregnancy complicated by solid tumors of the ovary. Méd. orient, Par., 1904, viii, 169.

COUDERT, E. Pelvic and abdominopelvic solid tumors of the ovary and their relation to pregnancy and labor. Obstetrique, Par., 1904, ix, 55.

COUVELAIRE. Removal by the abdominal route of pelvic ovarian tumors at the end of pregnancy. Ann. de. gynéc. et d'obst., 1912, vi, 277.

CUMSTON, C. G. Ovariotomy during pregnancy. Am. J. Obst., N. Y., 1908.

DAVIS, E. P. Ovarian tumor with twisted pedicle complicating pregnancy. Am. J. Obst., N. Y., 1909, lix, 994.

DAVIS, E. P. Ovarian tumor with twisted pedicle complicating pregnancy. Tr. Am. Gynec. Soc., 1909, 34.

DEMOCH, I. Vaginale Ovariotomien in Graviditate. Monatschr. f. Geburtsh. u. Gynäk., 1907.

DÜHRSSEN, A. Treatment of tumors complicating pregnancy and labor, especially cystic tumors of the ovary. Deutsche med. Wchnschr., 1904, xxx, 1529.

FALTAU, S. Ovariotomy during pregnancy. München. med. Wchnschr., 1905, lii, 2542.

FALTAU, S. Über Ovariotomie während der Schwangerschaft. Arch. f. Gynäk., 1907, lxxxii, 452.

FELLNER, O. O. Tumor und Schwangerschaft. Gynäk. Rundschau, 1911.
FORSTER, D. Ovarian tumor complicating pregnancy with recovery after operation. J. Mo. M. Ass., 1909 and 1910, vi, 657.
GRÄFE, M. Ovariotomy in pregnancy. München. med. Wchnschr., 1906, liii, 675.
HEIL. Study of ovariotomy in pregnancy. München. med. Wchnschr., 1904, li, No. 3.
GUICCIARDI. Ovarian tumors and pregnancy. Ginecologia, 1904, i, 262.
JEANNIN, C. Tumeur vegetante de l'ovaire et grossesse; ovariotomie; avortement; guerison. Bull. Soc. d'obst. de Par., 1909, xii, 342.
KALLMORGEN, W. Myome und Ovarialtumoren als Indikationem zum Kaiserschnitt. Zschr. f. Geburtsh. u. Gynäk., 1905.
KERR, J. M. M. Ovarian fibroid complicating pregnancy. Glasgow M. & S. J., 1908.
KEYES, A. B. Behavior, symptoms, and diagnosis of ovarian tumors in pregnant women. Illinois M. J., 1911, xx, 16.
KRUSEN, W. Ovarian tumors complicating pregnancy and the puerperium. Penn. M. J., 1907, ii, 599.
LEA, A. W. W. Ovarian tumors during pregnancy and the puerperium with notes on 7 cases. J. Obst. and Gynec. Brit. Emp., 1904, vi, 132.
LE JENTEL. Volumineuse tumeur vegetante de l'ovaire chez une femme enceinte. Bull. et mém. Soc. d. chir. de Par.
LOBENSTINE, R. W. Tumors of the ovary complicating pregnancy and labor. Bull. Lying-In Hosp., N. Y., 1907, iv, 38.
MARSHALL, G. B. Ovarian tumor complicating pregnancy, labor, and the puerperium; with report of 8 recent cases and special reference to treatment. J. Obst. & Gynec. Brit. Emp., 1910, xvii, 81.
MOND, R. Schwangerschaft und Ovarialtumor. München. med. Wchnschr., 1900.
MURET, M. Tumors of the ovary and pregnancy. Rev. mens. de gynéc., d'obst. et de pédiat., Par., 1913, viii, 322.
OLSHAUSEN. Myoma and pregnancy. Veit's Handb. d. Gynäk., 1897, ii, 765.
O'MALLEY, A. Pelvic tumors in pregnancy. In O'Malley and Walsh, Essays Pastoral Medicine, 1906.
ORGLER. Prognosis and indications for ovariotomy during pregnancy. Arch. f. Gynäk., 1901, lxv, 126.
OUI. Embryomata of the ovary and pregnancy. Bull. soc. d'obst. et de gynéc. de Par., 1912, i, 52.
PFANNENSTIEL. Ovarialtumoren bei graviden Uterus. Deutsche med. Wchnschr., 1907.
PINARD. Fibromata and pregnancy. Ann. de gynéc. et d'obst., 1901, lv, 165.
PUECH, PAUL, and VANVERTS, J. Tumors of the ovary and pregnancy. Ann. de la Policlin. de Par., 1913, xxiv, 227.
PUECH, PAUL, and VANVERTS, J. Tumors of the ovary and pregnancy. Lille, 1913.
REITLAFF, O. Zu Ovariotomie in der Schwangerschaft während der Geburt und im Wochenbett. Monatschr. f. Geburtsh. u. Gynäk., 1907.
SALTZMANN, F. Fixed ovarian tumors which prevent the rising of the pregnant uterus from the contracted pelvis. Mitt. a. d. gynäk. Klin. d. O. Engstrom in Helsingfors, Berl., 1910, viii, 161.
SEMMELINK, H. B. Ovarialtumoren in het kleine bekken tijdens de zwangerschap. Festb. opgedr. aan H. Treub, Leiden, 1912, 83.
SPENCER, H. R. Ovarian tumors complicating pregnancy, etc. Surg., Gynec. & Obst., 1909, viii, 461.
SPENCER, H. R. Two cases of ovarian fibroid complicating pregnancy. Proc. Roy. Soc. Med., 1909, ii, Obst. & Gynec. Sect., 231.
STEWART, J. Solid fibroid of ovary obstructing delivery. Brit. M. J., 1908, ii, 1545.
SWAN, WM. E. The management of solid tumors of the ovary complicating pregnancy, with report of a successful case. Bull. Johns Hopkins Hosp., 1898, ix, 56.
VON WINCKEL, F. Handb. d. Geburtsh., 1904, ii, 500.
WELLER, HUGO. Beitrage zur Frage der doppelseitigen Ovariotomie in der Schwangerschaft; 1906. (Bilateral ovariotomy in pregnancy.)
WERMUTH, A. Sarcomata of the ovary; their incidence and complications. Ztschr. f. Geburtsh. u. Gynäk., 1910, lxvi, 125.
WEISINGER, F. Ovarian tumors and pregnancy. Pest. med.-chir. Presse, Budapest, 1912, xlviii, 133.
YAMAYA, T. Kasuistische Beitrage zur Frage der Ovariotomie in der Schwangerschaft. Göttingen, 1909.
ZICKEL, G. Carcinoma of the ovary and pregnancy. Zentralbl. f. Gynäk., 1907, xxxi, 385.

COMPLETE REMOVAL OF ADENOCARCINOMA OF UTERUS BY EXPLORATORY CURETTAGE

With Report of Three Cases[1]

By LOUIS J. LADINSKI, A.B., M.D., F.A.C.S., New York

Professor of Gynecology, New York Polyclinic Medical School and Hospital; Gynecologist, Beth Israel Hospital; Visiting Surgeon, Gouverneur Hospital; Consulting Gynecologist, Hospital for Deformities and Joint Diseases, New York, and Saint Mary's Hospital, Waterbury, Connecticut

HISTORICAL

ANY incident that may throw additional light, however faint, on the important and all absorbing problem of cancer, is deserving of our investigation and study.

That an early adenocarcinoma of the uterus can be completely removed by curettage was established as an undoubted scientific fact in 1896. In that year, Gessner (1) read a paper on "The Value and Technique of Exploratory Curettage" before the Obstetrical and Gynecological Society of Berlin, and incidentally reported two cases. His report was accepted without a dissenting voice, which was in marked contrast to the action of the same society ten years before. When in 1886, Dr. Martin demonstrated a uterus from which the cancerous growth was removed by curettage, the members of the Society regarded it as a case of mistaken diagnosis, and the extirpation as unjustified. However, with the exception of an item to which I shall later refer, I can find no record in the literature since then that the radical removal of an early adenocarcinoma by the curette has ever been questioned.

The cases of Gessner, the first of which is exceedingly interesting and instructive, are as follows:

Case 1. The woman was 33 years old, sterile; suffering from irregular menses and discharge. Owing to the age of the patient, and the size of the uterus, there was no thought of possible cancer of the uterus. The microscopic examination of the curetted tissue revealed adenocarcinoma. From a clinical point of view there was doubt as to the correctness of the diagnosis, which doubt was all the more strengthened by the fact that the extirpated uterus was small, and upon microscopical examination by Gebhard, of eight different portions, showed no evidence of cancer. For several years this case served as an example, in the clinic, of mistaken diagnosis. Upon examination of the uterus with the magnifying glass Gessner could find no point of the mucosa which was suspicious of cancer. Convinced, however, of the correctness of the microscopical diagnosis, he went to the trouble of having the whole uterus sectioned. He began with the fundus, so that his patience was sorely tried. Above the internal os, in the posterior wall, an area 6mm. in diameter was found, which showed adenocarcinoma.

Case 2. Woman 52 years old, nullipara. Menopause for seven years. For six months suffered from profuse, often bloody discharge.

In the last month or so, marked hæmorrhage, no pain. Examination: Uterus small, retroflexed. Curettage showed adenocarcinoma of corpus uteri. Uterus extirpated. No sign of cancer in the extirpated uterus.

Gessner believed that in this case, in spite of the failure to find cancer in the extirpated uterus, the patient was suffering from cancer, and the microscopical diagnosis of the scrapings was not a case of mistaken diagnosis.

In commenting on the first case, Gessner made the following statement: "I consider it entirely possible to remove a superficial cancer of the mucosa of the uterus so radically with the curette that no traces of cancer can be demonstrated in the extirpated uterus, and that this is just as possible as the complete removal by the curette of an inflamed, degenerated area of the mucosa."

In discussing Gessner's paper, Veit (2), Kiefer (3), and P. Rüge (4) reported similar cases, as follows:

Case 3. Veit cited the case of Dr. Martin, of adenocarcinoma, referred to above, and gave credit to Schroeder for emphasizing the importance of microscopical diagnosis in gynecological cases, and to P. Rüge for demonstrating the value of diagnostic curettage. He commented on the fact that it was then accepted as a case of mistaken diagnosis.

Kiefer reported the following case from Martin's clinic:

[1] Read before Section of Obstetrics and Gynecology, New York Academy of Medicine, October 27, 1914; before the Clinical Society New York Polyclinic Medical School and Hospital, November 2, 1914, and before the Eastern Medical Society, November 13, 1914.

CASE 4. Curettage revealed adenocarcinoma. In the uterus, in spite of the most zealous search, nothing malignant could be found. He considered these as "The favorable, but at the same time rare, cases in which a beginning carcinoma causes sufficient symptoms to lead a patient to a physician who does the right thing." He regarded the prognosis in these cases as undoubtedly good.

P. Rüge cited a case he observed in June, 1886.

CASE 5. He curetted a uterus because of bleeding for several months. The scrapings were so unsuspicious in appearance that the patient was allowed to go home.

The microscopic examination made by P. Rüge, showed malignancy. The patient was notified of this, and came back for total extirpation. The extirpated uterus did not show any cancer; after a long search, a very slight suspicious spot was found in the reformed mucosa.

Very remarkable, however, is the fact that six months after operation Rüge's patient died of carcinoma of the liver, although the primary carcinoma at the time of operation, was only at its beginning.

Rüge presented the case as illustrating early recurrences in spite of removal of the disease in its incipiency. (This case is in all probability the one operated by Dr. Schroeder and is later reported by Stratz.)

In 1897, Krukenberg (5), reported a case of carcinomatous polyp:

CASE 6. Patient, 32 years old, nullipara. Had hæmorrhages in the intramenstrual periods. Examination revealed a polyp situated on the anterior lip of the cervix, while the base of the polyp gradually merged into the mucous membrane of the cervix. Curettage showed an ordinary endometritis; the polyp was excised. Microscopical diagnosis (by Rüge): "Malignant degeneration of Polyp." The patient, refusing an operation, was examined at half yearly intervals by her physician. A year and one-half after the excision of the polyp the patient showed no recurrence, but the further course of the case could not be obtained.

In 1898 von Franque (6) reported the following case:

CASE 7. Patient 50 years old bled repeatedly, after four years of menopause. Exploratory curettage revealed "carcinomatous changes of the surface and glandular epithelium" and total extirpation was done. The extirpated uterus seemed to be free from cancer. Microscopic examination of numerous sections of the uterus revealed a few cancer-cells in one small area, which was confined to the mucosa.

CASE 8. In 1902 Zweifel, (7) in a discussion before the Medical Society of Leipzig, stated that he had seen one case in which the diagnostic curettage showed adenocarcinoma while the extirpated uterus gave no evidence of it.

In 1905 Vassmer (8) published a paper under the caption of: "Can a permanent cure of a beginning adenocarcinoma of the uterus be effected by curettage?" and reported the following case:

CASE 9. In 1901 he received a specimen of uterine scrapings for microscopical examination, with the attached note: "Patient tuberculous, 45 years of age, bled for 14 days." His diagnosis was incipient adenocarcinoma, and he wrote to the physician, recommending total extirpation. Later on he learned that the physician had attempted total extirpation, but owing to severe hæmorrhage, had to give it up. As the hæmorrhage from the uterine mucosa ceased after the attempt at extirpation, the physician did another curettage and sent the material for microscopical examination to the pathological institute at Göttingen, and received the surprising report that nothing malignant was found. The same negative result was reported after a third curettage also made in Göttingen. In order to obviate the possibility of an error on his part, he sent the specimen which he had received from the first curettage to Göttingen, and his findings of carcinoma were confirmed there. In his letter to Gessner, Mundt, of the Göttingen Institute, made the following statement: "If we should suppose that the second and third scrapings covered the entire surface of the uterine mucous membrane, we have here a case in which an incipient malignant tumor was removed by a single curettage. Professor Aschoff recalls an analogous case, in which a similar finding was reported; in that case when the uterus was extirpated, he was exceedingly astonished to find no trace, macroscopically or microscopically, of cancer."

Dr. Vassmer was certain that there was no mistake in the identity of the specimen sent to him, and that the three specimens were obtained from the same patient. Dr. Vassmer heard from the case four years later, when she was still free from recurrence.

In 1910, Winiwarter (9) reported before the gynecological society of Vienna, a rare case of polyp of the uterine mucosa, which had undergone malignant degeneration.

CASE 10. Patient 66 years old, five normal labors — last one twenty-eight years ago; menopause for sixteen years; for four weeks she had bled profusely.

Examination: Serous vaginal discharge, a polyp the size of a gulden (twenty-five-cent piece) with necrotic surface, attached to the uterine wall, projected into the vagina. Diagnostic curettage showed

carcino-sarcoma. Removal of tumor and vaginal hysterectomy. Cancer was found throughout the substance of the polyp, whereas the wall of the uterus was entirely free from it.

In 1911, Chodounsky (10) published a case of carcinomatous polypus.

CASE 11. A woman, 49 years old, had suffered from severe uterine hæmorrhage for some time. In the extirpated uterus he found in the fundus, a tumor the size of a small apple, brownish-red in color, sessile. Microscopic examination showed adenocarcinoma. Between the tumor and the neighboring mucous membrane there was a sharp line of demarcation. In the glands and the epithelium of the rest of the surface of the uterus no changes or metaplasia could be discovered.

In 1911, Ogorek (11) reported before the Obstetrical and Gynecological Society of Vienna, a case of carcinomatous uterine polyp.

CASE 12. Woman, 62 years old. In the body of the uterus was a polypoid adenoma, the size of a hen's egg; near this was another tumor, the size of a hazelnut; there were other intramural and subserous myomata. Carcinoma had developed on the tip of the polyp, but neither in the pedicle nor in any other part of the uterus were there any signs of cancer.

In 1913, Graff (12) demonstrated before the Obstetrical and Gynecological Society of Vienna, a case of "Carcinomatous Uterine Polyp."

CASE 13. Specimen from a woman 32 years old, V-para. Patient admitted to hospital for persistent profuse bleeding. Examination revealed a submucous myoma, the size of an egg, attached to the posterior uterine wall on the left side. Enucleation of myoma. Microscopic examination showed primary glandular carcinoma, developed from myoma. In view of these findings, vaginal extirpation of the uterus was done. Histological examination of the various portions of the wall did not show the slightest signs of carcinoma. Dr. Graff calls attention to the apparently frequent coincidence of myoma (especially of submucous origin) and carcinoma.

In 1913, Hess (13) published a paper entitled "Cure of a Case of Adenocarcinoma of the Uterus by Exploratory Curettage," and reported the following case:

CASE 14. Woman, 41 years old. Has had irregular uterine bleeding for three months, and a foul-smelling discharge. Vaginal examination revealed no marked changes, but in view of the bleeding, the foul-smelling discharge, and the history of carcinoma of her sister, exploratory curettage was done. Dr. von Hansemann made the microscopic examination and reported "undoubted adenocarcinoma." This diagnosis was confirmed by others. Radical operation was advised, but in view of the bad result in the case of her sister, the patient persistently refused. The patient continued to call for some time for further observation, although no therapeutic measures were undertaken. After quite some time she appeared again for examination. Her symptoms were disappearing gradually, the bleeding, and especially the foul-smelling discharge, had disappeared. A reëxamination, (after four years) showed the woman to be perfectly healthy from a clinical standpoint.

Hess' paper stimulated further contributions to the subject in 1913: von Hansemann (14), in commenting on the case of Hess, confirmed the diagnosis of undoubted carcinoma in that case, and stated his belief that all parts of the tumor had been removed by the curette. He considered these cases as very rare, and reported the following case from Dr. Koblanck's practice:

CASE 15. A girl, seventeen years old, was subjected to an exploratory curettage for suspected tumor. The microscopic examination proved undoubted carcinoma. The uterus was removed, and examination of serial sections of the whole mucous membrane of the extirpated uterus did not show a single spot which looked like carcinoma. The mucous membrane of the slightly enlarged uterus was normal so far as it was not removed by the curette, as was the musculature. The exploratory curettage had completely removed all traces of carcinoma.

In 1913, P. Prym (15) reported a case of complete removal of carcinoma of the uterus by exploratory curettage.

CASE 16. Woman, 49 years old (patient of Dr. Trebes, Bonn). Had profuse bleeding and foul-smelling discharge for three months. Clinically there was a suspicion of carcinoma. On July 8, 1911, curetted material from the uterus was sent to the Bonn Pathological Institute for examination: Scrapings consisted of many shreds of mucous membrane, and one mass about the size of a small hazelnut. The latter proved, histologically, to be a typical carcinoma, while in the remaining particles there was no suspicion of carcinoma. The uterus was extirpated eight days later by Dr. Trebes. It proved to be a myomatous uterus in which no carcinoma could be seen. Most extensive sections of the wall were then examined histologically, but nothing suspicious was found. According to an oral communication by Dr. Trebes the woman had remained well for two years.

The communication of Dr. Hess induced Dr. Prym to look over the specimen again, and he also prepared further sections. "There was no doubt about the diagnosis. It was a small polypoid

No.	Date	Reported by	Character of Growth	Lesion in Mucosa	Lesion in Polyp	Curettage followed by Extirpation	Curettage not followed by Extirpation	Reason for not Extirpating the Uterus	Duration of Freedom from Recurrence
1	1886	Martin (same case reported by Veit, in 1896)	Adenocarcinoma	x		x			Not given
2	1896	Gessner	Adenocarcinoma	x		x			Not given
3	1896	Gessner	Adenocarcinoma	x		x			Not given
4	1896	Kiefer	Adenocarcinoma	x		x			Not given
5	1896 1913	P. Rüge P. Stratz	Adenocarcinoma	x		x			Six months
6	1897	Kruckenberg	Adenocarcinoma		x		x	Patient refused operation	1½ year
7	1897	von Franque	Adenocarcinoma	x		x			
8	1902	Zweifel	Adenocarcinoma	x		x			
9	1905	Vassmer	Adenocarcinoma	x			x	Extirpation attempted but was given up because of profuse hæmorrhage	4 years
10	1910	Winiwarter	Adenocarcinoma		x	x			
11	1911	Chodounsky	Adenocarcinoma		x	x			
12	1911	Ogorek	Adenocarcinoma		x	x			
13	1913	von Graff	Adenocarcinoma		x	x			
14	1913	Hess	Adenocarcinoma	x			x	Patient refused operation	4 years
15	1913	von Hansemann	Adenocarcinoma	x		x			
16	1913	Prym	Adenocarcinoma		x	x			2 years
17	1913	Benthin	Adenocarcinoma	x		x			
18	1913	Benthin	Adenocarcinoma	x		x			
19	1913	Unterberger	Adenocarcinoma		x	x			
20	1913 1914	I. C. Rubin Ladinski	Adenocarcinoma		x	x			
21	1914	Ladinski	Adenocarcinoma		x?		x	On advice of surgeon, whose curettage subsequently showed no malignancy	1 year
22	1914	Ladinski	Adenocarcinoma		x	x			
		Total	22	12	10	18	4		

carcinoma which was completely removed by the curette."

In 1913, Stratz (16) reported the following case: (This was probably the case mentioned by P. Rüge.)

Same case as 5. In the year 1886, C. H. Stratz made a microscopical diagnosis of carcinoma from scrapings from a patient curetted by Dr. Schroeder. Exploratory curettage had been done repeatedly at intervals of two years at the request of the patient, because her mother had died of cancer. It was the third or fourth time when he (Stratz) was asked to make the microscopic diagnosis; the diagnosis of carcinoma was confirmed by Rüge, who, at previous examinations had always found normal endometrium. In view of these findings Schroeder did a vaginal hysterectomy, and in spite of the most thorough examination no trace of cancer could be found in the extirpated uterus.

In 1913, W. Benthin (17) reported two cases, and Unterberger, one case, before the Norddeutsche Gesellschaft für Gynäkologie at Königsberg.

CASES 17 and 18. In Benthin's two cases, the scrapings showed microscopically typical adenocarcinomatous tissue. He then extirpated the uteri and could find no traces of malignancy.

Unterberger (18), discussing the above cases, mentioned a similar case which he had seen at the Rostock clinic.

CASE 19. Case of chronic metritis with a small capsular myoma, and a pea-sized mucous polypus in the fundus uteri.

Histological examination of the uterine mucosa showed normal structure. The base of the polypus was benign, while the mucosa of the polypus was of typical carcinomatous tissue. It was Unterberger's belief that if this patient had been curetted, a diagnosis of carcinoma would undoubtedly have been made, which, on total extirpation of the uterus, would not have been confirmed.

PERSONAL CASES

My personal cases are three in number. The first case came under my observation in April, 1911. The patient was curetted at Beth Israel Hospital. Curettings examined by Dr. E. Moschcowitz showed adenocarcinoma. On this finding a panhysterectomy was done; on section the uterus showed a polyp about the size of a hickory-nut at the base of the fundus. Microscopical examination of sections from this polyp and of the uterus showed no evidence of carcinoma.

I did not report this case then because I felt that one case might not prove sufficiently convincing. Moreover, in a very excellent paper on "The Early Diagnosis of Uterine Cancer, with Especial Reference to Diagnostic Excision of Cervical Lesions, Diagnostic Curettage, and the Routine Microscopy of Curettings," which was published in the *American Journal of Surgery*, in November, 1913, Dr. I. C. Rubin reported this case, both as an example of early diagnosis of uterine cancer, as well as a case of complete removal of adenocarcinoma by curettage.

CASE 1. I saw this patient, F. L., in consultation in April, 1911, because of profuse uterine hæmorrhage, and referred her to Beth Israel Hospital. As this case was reported by Dr. Rubin long before there was any question as to the correctness of the microscopical diagnosis of carcinoma in my second case, I think it best to quote the history of, and comments on, the case as given by him, which are as follows:

"The patient was 51 years old (the age was printed incorrectly in Dr. Rubin's article), married 28 years, has had four children. Had been bleeding for a number of months. She had been curetted several times, but hæmorrhage continued.

"On examination the uterus was large and soft; there seemed to be a hard nodule near the fundus, which could be made out by manual palpation. The sound caused bleeding from the enlarged uterine cavity. A preliminary curettage was done for diagnostic purposes. On examination of the curettings it was found that there was a typical adenomalignum with early adenocarcinoma. The glands were enormously enlarged and increased in number. The hyperplasia was so marked that the glands lay *dos-a-dos*, very little stroma, if any, intervening. There was papillary proliferation of the epithelium within the lumina, and also an actual increase in the layers of cells, which were atypical in appearance and showed mitosis. On this finding, a panhysterectomy, modified after Wertheim, was done.

"The uterus, on section, showed an elongated polyp, about the size of a hickory-nut, with its base at the fundus. It showed evidence of curettage. Microscopic examination of this polyp and of the uterine mucosa showed, however, no area of carcinoma. It was evident that all the lesions had been removed by the curette."

Dr. Rubin's comments on this case follow:

"The bleeding in this case was, in all probability, due to the submucous polyp, and not to the very small area of carcinomatous conversion of the polyp.

"In this case carcinoma was clinically suspected and was corroborated by the diagnostic curettage. The cause of the suspicion, viz;

hæmorrhage, was, however, the submucous polyp. The incipient carcinoma was merely grafted upon it and was altogether too young to give rise to the brisk and persistent hæmorrhage. It was simply a coincidence which was revealed by careful routine and laboratory examination.

"Curettage had been practiced several times, but only once, i.e., the last time, was the material removed properly utilized by subjecting it to an examination for the benefit of the patient."

CASE 2. Mrs. D. B., 47 years old, married 22 years, had never conceived. She had menstruated regularly, every four weeks, one to five days, until two years ago, when the menses ceased for a whole year; for the past year, however, she bled irregularly on and off; there was no pain.

I saw the patient at my office for the first time on October 7, 1913. On examination I found the uterus somewhat larger than was to be expected in a woman who had never conceived, and had begun the menopause two years ago. A small, bleeding mucous polypus protruded from the os, which I snipped off, and which, on microscopical examination, proved to be benign. I gave a very good prognosis, and requested her to report at my office every four to five days.

As the bleeding continued for five weeks after the removal of the polypus, I advised a curettage, which I did at Beth Israel Hospital on November 14, 1913. The scrapings consisted of shreds and several pieces of tissue the size of peas. Dr. Eli Moschcowitz, the pathologist, reported a few days later that the scrapings showed "adenocarcinoma." I then informed the patient's husband of the finding of malignant disease by the pathologist and advised an immediate hysterectomy. He decided to wait a while and removed his wife from the hospital. A day or so later, at the request of her family, I wrote a letter to Dr. H. C. Coe, in which I gave her history and the microscopical findings and requested his opinion. Dr. Coe's examination revealed a uterus somewhat enlarged and the os patulous, and taking into consideration the suspicious history together with the pathological finding of the scrapings, concurred with me as to the necessity for hysterectomy. I learned this subsequently from Dr. Coe, as the patient did not return to me with his answer. A few days later she consulted another surgeon, who gave his opinion as the result of his first vaginal examination and before doing an exploratory curettage that she did not require a hysterectomy, and that she never did have cancer. However, a curettage performed by this surgeon on December 6 showed no signs of cancer on microscopic examination by competent pathologists.

After he was assured by Dr. Moschcowitz that the specimen examined by him was undoubtedly adenocarcinoma and was positively removed from this patient as proved by the statements of the assistant pathologist, members of the house staff, and the technician of the laboratory of Beth Israel Hospital, all of whom were concerned in handling this specimen, he again curetted the patient, and the microscopic examination of the scrapings showed no trace of malignancy.

In this second case the growth was, in all probability, originally a polyp which had undergone malignant degeneration. A benign polyp was demonstrated clinically before the operation, and the size of the curettings appear to confirm a polypoid growth. The pedicle and adjacent portion of the uterus were evidently not involved. Whether the tumor was an ordinary adenomatous polyp that had undergone carcinomatous degeneration, or a primary adenocarcinoma that had assumed a polypoid shape cannot be determined.

CASE 3. L. L., age 63 years, married 44 years. Has had twelve children, the last twenty-four years ago. Menopause for ten years. Consulted me because of uterine hæmorrhages for the past ten weeks.

Vaginal examination showed: uterus enlarged, os patulous. Exploration of the cervical canal with finger revealed a uterine polyp, with the pedicle apparently attached close to the fundus. Patient was admitted to Beth Israel Hospital on May 29, 1914. Under ether anæsthesia the cervix was dilated, and an attempt was made to excise the polyp, but, owing to its extreme friability this was impossible, and its removal was effected piecemeal by means of the curette. About fifty or sixty irregular masses, varying in size from peas to hickory-nuts were removed. Microscopical examination of sections of various masses showed necrotic adenocarcinoma, the tissue showing a combination of the solid and adenocarcinoma. Upon this finding an abdominal panhysterectomy was done, on June 2, 1914.

The extirpated uterus showed macroscopically: apparently healthy endometrium, and on the posterior wall, near the fundus, was still attached a small pedicle, the size of a hazelnut. Microscopical examination of sections made of the pedicle, as well as of other parts of the uterus, showed no traces of adenocarcinoma.

In connection with this case the following letter from Dr. Cullen is of interest:

"I have just finished reading your very interesting paper on 'Complete Removal of Early Carcinoma of the Uterus by Exploratory Curettage.' The historical résumé you have given is a most instructive one. The men who have made reports

are so well known that what they say naturally carries much weight. Your case, Lubman (Case 3), is a most convincing one and even if there had been no literature on the subject before would have proved conclusively that the curette may, in rare instances, entirely remove a cancer.

"I think that the meager literature on the subject clearly indicates that the possibility of complete removal of carcinoma by the curette is a great rarity. You are thoroughly familiar with the fact that in many of the European clinics careful examination is made of all the material, and had such cases occurred more frequently they certainly would have been published. In our conversation when you were here we referred to the routine examinations we have made at Hopkins. The Gynecological Laboratory came under my care in 1893, and from that date until the present every piece of tissue from the operating room has been carefully and systematically examined. During that period of twenty-one years we have never had a case analogous to the ones under discussion. In other words, thus far in every case where we diagnosed carcinoma, from scrapings we have later been able to find macroscopically, evidences of cancer in the body of the uterus when the organ had been removed. If this condition were a common one then we certainly should have had several examples in a period of over twenty-one years."

Pathological Reports

BY ELI MOSCHCOWITZ, M.D., NEW YORK
Pathologist, Beth Israel Hospital

Case 1. Specimen consists of uterus, right ovary and tube, and small portion of left tube and left ovary. Uterus is 9½ cm. long, and 6 cm. in width at its greatest diameter. The peritoneal surface is smooth and near the junction of the left tube is a small pedunculated fibromyoma, about the size of a hazelnut.

On opening the uterus anteriorly, the fundus is occupied by a pedunculated mass which fills the entire upper portion of the uterine cavity, its tip extending to 1½ cm. above the internal os. The base of this mass is broad and attached to the entire circumference of the fundus. The surface of the mass is smooth, its consistency soft, and its color pale red. The mucosa of the uterus is smooth throughout. The cervix presents a few cystic erosions, but is otherwise normal.

The right tube presents no gross abnormality. The right ovary is normal in size and deeply scarred.

Microscopical examination of curettings. Curettings from the uterus removed by Dr. Ladinski in April, 1911, revealed the following: The slide made from these curettings consists largely of blood and fibrin in which are enmeshed small and larger particles of tissue of glandular type. Some of these show uterine glands that are obviously normal; the greater number, however, show glands that are extremely convoluted. In some areas these convolutions are so prominent as to resemble a papilloma in appearance. The majority of these adenomatous spaces are large and their lumina are occasionally filled with blood and fibrin. The epithelial cells are irregularly arranged, and consist of two or more layers, the nuclei are vesicular, rich in chromatin, and are irregular both in size and shape. Mitotic figures are few and easily demonstrable. The penetration of the epithelium through the membrana propria is easily recognizable. In some situations the lumina are so nearly filled with the exuberant epithelium as to resemble a carcinoma of the solid variety. The stroma between the adenomatous spaces is very thin and in some places nearly absent, so that the epithelial cells of adjacent glands seem to be in contact.

Diagnosis: Adenocarcinoma of the uterus.

Microscopical examination of the uterus and polyp: Sections were taken from the tip of the polyp, the curetted area described above, the base of the polyp, and from a number of areas in the uterine wall. Sections from the polyp show throughout a uniform appearance, both at the base and at the tip. The polyp is of the conventional adenomatous type, containing small and larger glands of uterine type lined by a single layer of regularly arranged, low cuboidal cells. Some of the glands are slightly convoluted, but there is no sign of reduplication or atypicism of epithelium.

The stroma is very abundant and consists of smooth muscle fibers containing a small amount of fibrous tissue and small blood-vessels.

The curetted area near the tip of the polyp was especially carefully examined, but, with the exception of a hæmorrhagic stroma due to the trauma of the curettage, there was not the slightest suspicion of any tissue resembling the curetted material.

Diagnosis: Pedunculated adenomyoma of the uterus.

Case 2. From the material removed by curetting, two slides were prepared. The first reveals two fair-sized masses, each about 1 cm. in diameter and a few smaller shreds with some blood and fibrin. The larger masses consist of glandular spaces which are very irregular in size and conformation. These glandular spaces are lined by two or more layers of epithelium, which vary in shape from low cuboidal to high cylindrical. In many of the more closely packed spaces the cells are polyhedral. The epithelial cells vary greatly in size, the nuclei are also irregular in size and shape. They are irregularly situated, vesicular, fairly rich in chromatin, and show few mitotic figures. The membrana propria of these adenomatous spaces are invaded so that adjacent spaces communicate. In places the epithelial cells completely fill alveoli, which are irregular in size and contour. The stroma is abundant, and consists of fibrous tissue infiltrated with many round cells, and in many places distinct muscular fibers are visible. The smaller shreds of tissue in this specimen reveal structures identical with those described.

The second slide reveals about one-half dozen small masses, each varying, about the size of a millet seed. Some of these masses show solid nests of epithelial cells similar to those above described, embedded in a stroma resembling the stroma of the uterine mucosa. The others show endometrium of the normal premenstrual type.

Diagnosis:: Adenocarcinoma of the uterus.

CASE 3. Specimen consists of uterus and both tubes and ovaries. The uterus is 11 cm. long and 7½ cm. at its greatest diameter. The peritoneal surface is smooth. On opening the uterus anteriorly, the cavity is found dilated, measuring 5½ cm. longitudinally and 5 cm. at its greatest diameter. The mucosa of the uterus is pale red, and perfectly smooth. Attached to the posterior wall of the cavity, about 1½ cm. from the fundus and a little to the right of the median line, is a small pedicle 1¾ cm. long, which is attached to the uterus by a narrow pedicle about ¼ cm. in diameter. The tip is slightly bulbous, intensely hæmorrhagic and presents a traumatized surface. The uterine wall averages 1 cm. in thickness, is firm, and presents no gross abnormalities. Both fallopian tubes are normal. The ovaries are normal in size and considerably scarred.

Microscopic examination of curettings: The curetted material consisted of about fifty masses of tissue, varying in size from a hazelnut to a split pea. All the masses are hard and firm. *The predominant type of tissue in the masses is a combination of solid and adenocarcinoma.* The carcinomatous alveoli are small, the epithelial cells which line these alveoli in single or double rows, or completely fill them are large, polyhedral, and vary much in size and shape. The nuclei are large, vesicular, vary greatly in size, and are very rich in chromatin. The stroma is sparse and consists of delicate strands of fibrous tissue, œdematous in many places. Scattered here and there are a few muscular fibers. The stroma is fairly rich in blood-vessels. There is extensive necrosis. Some sections show this necrosis in small focal areas, other sections are completely necrotic so that only shadows of tumor tissue, staining intensely with eosin, are visible.

Some of the sections indicate the polypoid nature of the mass by a covering of low, cuboidal epithelium upon the surface.

Microscopical examination of the pedicle remaining within the uterus. Sections were taken from the tip of the pedicle and from its base.

1. The section from the tip shows an intensely hæmorrhagic and partially necrotic area of tissue in which may be recognized small areas of fairly well preserved vascular connective tissue, and a large number of markedly dilated blood-vessels. Along the borders of the tip there is a fibrinous exudate.

2. Sections from the base show a fibromuscular structure in which are embedded a fair number of glands of normal uterine type. The connective-tissue cells of the stroma are considerably swollen, resembling decidual reaction. There is not the slightest evidence of carcinoma in any of the sections removed from this pedicle.

Sections removed from the wall of the uterus proper show entire absence of a mucosa. The mucosa has been converted into tissue resembling granulation tissue, containing a large number of small, young blood-vessels, and an occasional uterine gland.

Diagnosis: Adenomyoma.

The muscular coat of the uterus shows a moderate amount of fibrosis. The blood-vessels show hyaline degeneration.

BY DR. JAMES EWING, M.D., NEW YORK
Pathologist, Cornell University Medical College

CASE 1. Section 1,562. The material consists of many fragments of curettings. The structure presents two main features: (1) Compact groups of distinctly atypical hyperplastic uterine glands; and (2) compact small groups of large opaque polygonal epithelium which lie in the stroma between the glands.

The former resembles the ordinary adenoma destruens of the fundus. The latter appears to arise from infiltration of the stroma by low papillar projections dipping down from the surface epithelium. I interpret this case as an early adenocarcinoma of the fundus.

CASE 1. Section 1,591. The section shows a pedunculated uterine polyp with a segment of underlying muscularis about one centimeter thick. The polyp is a fibroglandular growth with slight admixture of muscle-cells. The glands are hypertrophic, lumina dilated, and lining cells slightly atypical. There are no definite signs of malignancy in this process.

CASE 2. Section 4,398. The material appears to consist of curetted fragments of uterine mucosa, and it contains many portions of a malignant epithelial tumor. The structure of the tumor varies. There are many large groups of cylindrical and cubical cells arranged in systems of alveoli, some of which are wide, others small. This is a typical appearance of early adenocarcinoma of the fundus. Other portions of the tumor are more compact, and are composed of whorls of large flat cells of squamous type or compressed spindle cells, or, occasionally, of cubical cells. They are arranged in large convoluted cases, and often inclose large empty spaces. This portion may be designated as adenocarcinoma, and probably also originates in the fundus.

This case is therefore an adenocarcinoma of the fundus uteri.

CASE 3. Section 4,955. Section shows a well circumscribed area of tumor-tissue which is composed of very small irregular alveoli, some with lumen, others without lumen, while some small groups of cells fail to exhibit an alveolar arrangement and are growing diffusely. The stroma is vascular, and is undergoing mucus degeneration.

CASE 3. Sections 4,963, from the pedicle, are composed of vascular inflamed fibromuscular tissue, in which are groups of swollen clear endothelium, but no portions of tumor-tissue.

CASE 3. Sections from the uterine mucosa near the base of the polyp show almost complete atrophy of mucous glands and stroma of mucosa. There is marked hyaline thickening about many vessels in the endometrium. Signs of a tumor process are absent. Section taken from the base of the pedicle shows inflamed muscular tissue of the uterus infiltrated with blood. A few low polypoid projections are visible, covered by one layer of slightly atypical epithelium. The stroma contains foci of large polyhedral hydropic cells, probably endothelium. Signs of a tumor process are missing in the pedicle.

This case is one of atypical adenocarcinoma of the endometrium. The peculiar structure suggests an origin from misplaced embryonal tissue.

BY FRANCIS CARTER WOOD, M.D., NEW YORK
Director of Cancer Research, Crocker Laboratory, Columbia University

CASE 1. Sections from curettings. Section 1,562. No. 1 shows an adenocarcinoma of the uterus, evidently some curettings. Section No. 2 shows the same.

CASE 1. Section from polyp. Section 1,591. No. 4 shows what I take to be a polyp of the uterus with a glandular hyperplasia and a fibrous stroma.

CASE 2. Sections from curettings. Section 4,398. No. 1 shows a solid carcinoma, presumably from the uterus as there are remnants of cervical glands in the specimen. No. 2 shows much the same picture. There are some solid and some glandular alveoli, and a tendency to alteration to squamous cell epithelium in some of the areas.

CASE 3. Sections from curettings. Section 4,955. No. 1 shows an adenocarcinoma of a fairly solid type with some production of mucus. No. 2 shows much the same picture.

CASE 3. Section from base of polyp. Section 4,963. No. 5 shows fibrous tissue invaded by glands which in some places are of the type of uterine glands and in others are high cylindrical, contain mucus, and look like cervical glands,

CASE 3. Section from base of polyp. There are several small areas with discrete spherical cells slightly suggestive of infiltrating carcinoma; other areas show large fatty or degenerated cells looking like those of xanthoma. I should judge that the latter are altered connective-tissue cells, the peculiar appearance being due solely to the inflammatory conditions in the tissues.

CASE 3. Section from tip of polyp. Section 4,963. No. 7 shows only a very small amount of highly vascularized connective tissue and blood-clot. There is no evidence of carcinoma.

BY W. G. MACCALLUM, M.D., NEW YORK
Pathologist, College of Physicians and Surgeons, Columbia University

CASE 1. In general I think that it may be difficult to arrive at an absolute diagnosis of the existence of an adenocarcinoma in curettings from a polyp of the uterus in some cases, as for example the first case (No. 1,562), since there the fragments of tissue are very small and look somewhat crushed. It is true that the glands are very complex in form and in some places one receives the impression that their lumina are partly or completely filled with epithelium but that may in places be inflamed as the effect of a tangential section. I do not think much stress can be laid upon their proximity to one another, and I was not able to find unquestionable examples of the loss of a definite gland line outline. On the other hand, in one section the surface of the polypoid tumor can be traced for some distance very clearly as a frill-line covering of high columnar epithelium and this covering overlies the very tissue in which the most complex glands are found, a condition which one finds in a polyp, but hardly, I should think, in a carcinoma. Nevertheless it is quite conceivable that carcinomatous changes might be found in the depths of a polyp whose surface was still intact.

In the sections from the uterus (1,591) and the polyp as it lay in the uterus, I saw nothing even suggesting a malignant growth, and it is very clear that the glandular structures in those sections are not nearly as complicated as those in the curettings.

CASE 2. In the second case (1,408) which was represented by two slides of sections from curettings and in which the uterus had not been extirpated, there is one mass which seems to me an undoubted carcinoma with irregular anastomosing, rounded, and hollow masses of epithelium. The atypical appearance of the cells and their relation to the musculature and connective tissue leaves no doubt, I think, as to their malignant mode of growth. Some parts of this tissue look rather like atypical squamous epithelium. But the other fragments of tissue on the same slide and all those on the other slide are of a quite different sort — there are contorted glands with clear, sharp, outline, and masses of normal squamous epithelium such as might come from somewhere near the uterine os. Of course, it is possible that they might come from an affected and an unaffected part of the uterus, and I take it for granted that the possibility has been excluded that curettings from two cases might have been mixed.

CASE 3. The third case (4,955 and 4,956) presents an extraordinary mass of curetted material and while several of the sections show chiefly blood-clot with a little connective tissue and blood-vessels with occasional remnants of epithelium, one section shows a tumor of very compact arrangement in which solid strands of cells rarely with a distinct lumina lie closely packed in a connective-tissue stroma. The cells have not the ordinary character of uterine epithelium but are extremely atypical, often with peculiar round, red-staining, occlusions, which may be dead and altered cells. I should think there is no question of the malignant anatomical type of this tumor although it does not resemble very closely the usual adenocarcinoma.

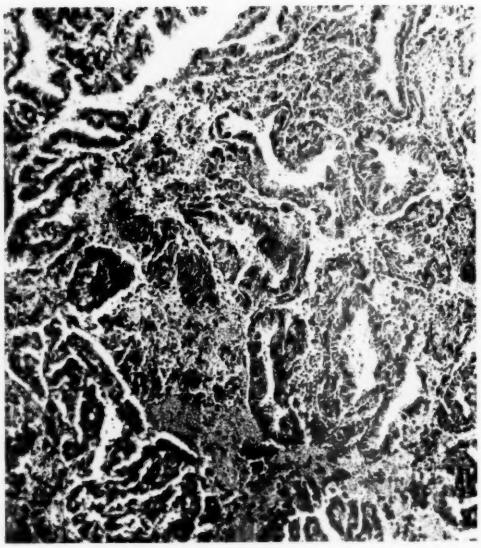


Fig. 1. Case 1 (1,562). Section of curettings showing typical adenocarcinoma.

In the sections from the uterus and from the pedunculated hæmorrhagic mass in the fundus I could find nothing remotely resembling a carcinoma. In this case the great quantity of tissue removed by the curette makes this latter finding especially interesting. Of course, one can easily imagine that an adenocarcinoma which must have a local beginning might be accidentally completely removed by a curetting in this early stage and when one remembers the relatively slight malignancy and slow invasiveness of these tumors in many cases, it is easier to believe that such interference might be successful in removing all the tumor. It is harder to understand in case 4,955, in which such great quantities of tissue were removed. On the whole I see no reason why such incipient tumors might not be happily and completely removed in this way although the chances of hitting upon this incipient stage must be rare.

I think, however, that it would be exceedingly unfortunate if the idea were spread abroad that carcinoma of the uterus is even occasionally curable by mere curetting, since this would undoubtedly be seized by the lay sufferer in her efforts to escape operation and might go far to annul the work of those who are advocating early operation.

BY F. M. JEFFRIES, M.D., NEW YORK
Pathologist, New York Polyclinic Medical School and Hospital

The microscopical sections you have submitted to me for examination have been carefully studied with the following findings:

CASE 1. Sections from curettings: Two slides, adenocarcinoma. Section from polyp: No evidence of neoplasm — a hypertrophic endometritis.

CASE 2. Sections from curettings: Both slides contain carcinoma, probably squamous celled.

CASE 3. Sections from curettings: Majority of slides contain adenocarcinoma. Sections from polyp: No evidence of neoplasm.

I have read your paper and must admit that one can conceive the possibility of the complete removal of an adenocarcinoma of the uterus by curetting if it happens to be at an early stage of development and the curetting is thoroughly done. Or it might also be accomplished in cases where the neoplasm originates on a polyp; but the chances for such happy results are exceedingly slight and I would deem it unwise to allow development of the idea that cures in such cases are thus obtained.

BY ISAAC LEVIN, M.D., NEW YORK
Chief, Cancer Research, Montefiore Hospital

CASE 1. The gross specimen of the first case presents a polyp at the fundus of the uterus. The microscopical specimens obtained from the scrapings show the condition of adenoma with a distinct beginning of invasive growth and malignancy. The microscopic specimens obtained from the extirpated uterus show no malignancy.

CASES 2 AND 3. The microscopical specimens obtained from the scrapings of the second and third case show a condition of adenocarcinoma.

CASE 3. The gross specimen of the third case shows a normal uterus with the remaining pedicle of a polyp at the fundus. The microscopical specimens obtained from the extirpated uterus show no malignancy.

SUMMARY OF COLLECTED CASES

Including my three cases, we have a record of twenty-two cases (all of which were carcinoma of the body of the uterus) where the disease was removed *in toto* by the curette. Of these, nine, and if we include my second case, ten were instances of carcinomatous degeneration of uterine polypi, and in the remainder the growth developed in the uterine mucosa. In nineteen cases extirpation of the uterus was practiced, while in four cases the curettage was not followed by a radical operation: in two because the patients refused the operation, in one the attempted extirpation was not completed on account of hæmorrhage, and in the fourth because the surgeon advised against it; the patients in whom no extirpation was done remained well from one to four years.

In all the cases cited the prominence of

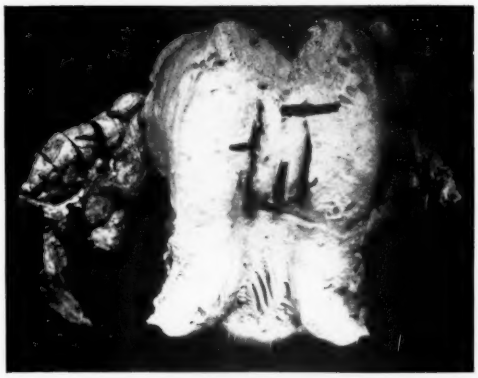


Fig. 2. Case 1 (1,591). Uterus cut anteriorly showing polyp attached to the fundus. Sections from this polyp and at various places in the wall of the uterus show no carcinoma.

the authors who made the studies and reports precludes any possibility of a mistake in diagnosis or a mix-up in the slides

As regards my own cases the appended reports of the distinguished pathologists leave no room for doubt as to the accuracy of the diagnoses.

In the second case, a most thorough and searching investigation instituted by Dr. Eli Moschcowitz, pathologist, as to the handling of this particular specimen proved beyond any question that there was no mix-up in the specimen or in the slides. Moreover, no specimen of carcinomatous curettings was submitted to the laboratory for examination from any source whatever either at that time or for a number of months previous to the presentation of this specimen, so that a mix-up of slides was a physical impossibility.

As to the theory that the scrapings could not come from the same uterus because the one submitted by me showed evidence of advanced carcinoma, that has been definitely eliminated by Dr. Moschcowitz, as well as by Schottländer (19) and the pathologists who studied the specimen; and if additional proof were necessary, the incontestible evidence is found in my third case, six months later, where the curetted polypus showed carcinoma far advanced, while sections from the uterus and pedicle showed absolutely no traces of malignancy.

Fig. 3. Case 1 (1,591). Section from the polyp showing typical adenoma.

That a carcinomatous growth can be totally removed by the curette when it is limited to a uterine polyp, or when it is confined to the mucosa is proved beyond any question of doubt by the cases cited above. Moreover, Schottländer (19) holds that a young carcinoma can also be removed by the curette when there is penetration into the muscular wall.

REASONS FOR SCARCITY OF RECORDS IN THE LITERATURE

In view of the prevalence of adenocarcinoma of the uterus, it is indeed remarkable that so comparatively few cases are on record of the removal of the growth by exploratory curettage. It is worthy of note that the cases reported thus far are found in foreign literature; the first case was reported about thirty years ago. A thorough search of the American and English literature does not reveal a single record of a case (with the exception of Dr. I. C. Rubin's report of my first case).

One reason for the failure to report these cases may be found in the fact that when a

Fig. 4. Case 2 (4,398). Section of curettings. Adenocarcinomatous polyp of the uterus. Solid carcinoma above, adenocarcinoma below.

subsequent curettage does not confirm the finding of carcinoma at the first curettage, or if the patient continues well for an indefinite time after curettage has shown adenocarcinoma, the circumstance is, as a rule, attributed to a mistaken diagnosis, and as a result the reports of such cases do not find their way in print. In fact, I personally have heard of several instances where a diagnosis made under such circumstances was accepted as a mistake without further question, and judging from the expressions on this point by nearly all of the writers I have quoted above a similar experience is not so very rare among surgeons. Vassmer especially made it a point to interview gynecologists and pathologists on this subject and as a result concluded that such cases are not at all uncommon.

The number of cases of carcinoma of the uterus seen by me in private and hospital practice, as compared with my other material, is so exceedingly small that the above report of three cases is another proof that other surgeons, who see more cases of cancer of the uterus than I do, must necessarily have had similar experiences.

Another reason for the apparent scarcity of reports of these cases, and which I hope will be brought home to American Surgeons, is that diagnostic exploratory curettage is not resorted to as often as it is indicated, and that the routine microscopical examination of curettings is not practiced to the extent that it should be; otherwise cases of early adenocarcinoma of the uterus, when the disease is still limited to the mucosa, would be recognized more frequently; and the possibility of its complete removal by means of the curette would be a matter of general knowledge. This is especially true in America, for it is inconceivable that of the tremendous number of patients suffering from adenocarcinoma, there is not a single record of a similar report in this country.

VALUE OF DIAGNOSTIC CURETTAGE IN ADENOCARCINOMA OF THE BODY OF THE UTERUS

That three such comparatively rare cases should come under my observation, and especially as two of them were discovered within the short interval of six months, may be one of those peculiar incidents met with in practice, but I cannot help believing that the diagnosis of adenocarcinoma in these cases was, to a certain extent, due to my practice of curetting every case giving the slightest suspicious history, and to the system in vogue at Beth Israel Hospital that all curettings are invariably examined microscopically as a routine procedure.

Schottländer urges preliminary curettage even in a myomatous uterus on account of the not infrequent incident of cancer and because a failure to do so may occasionally be followed by the development of cancer in the stump of the cervix after supravaginal hysterectomy. My experience in one case proved pretty conclusively that because a preliminary exploratory curettage was not practiced, an early adenocarcinoma of the uterus was overlooked:

In September, 1910, I had occasion to operate upon a patient who had had performed by another surgeon a few months previously, a supravaginal hysterectomy done for a supposed fibroid. I found

adenocarcinoma of the stump of the cervix, about the size of a child's head, which could not be removed. A diagnostic curettage preliminary to the supravaginal hysterectomy would have discovered that she was suffering from adenocarcinoma. This patient is still alive, after four and one-half years, with a pelvis full of carcinomatous masses; but the disease seems to have been held in check by X-ray treatment, administrated by Dr. Samuel Stern since the exploratory laparotomy (four years ago).

There are no better and safer means at our disposal to detect the disease in its incipiency than exploratory curettage and routine microscopic examination. Women should be impressed with the fact that any variation from the normal, especially in regard to the menstrual function, particularly when they have reached the climacteric (although no age is exempt from uterine cancer) should be regarded as suspicious and calls for an exploratory curettage and microscopic examination.

The address of Carstens (20) before the recent meeting of the American Association of Obstetricians and Gynecologists, on the necessity of constantly watching for cancer of the uterus by routine examination of all curettings, no matter for what condition the curettage is done, is timely, and should find its echo in every nook and corner of this land.

The prognosis is best for cancer of the body of the uterus when diagnostic curettage is done as early in the disease as possible, and the surest way to find adenocarcinoma in its earliest stage is to be in constant watch for it by microscopy of curetted material.

It must also be borne in mind that while no absolute reliance can be placed on palpation of the uterus and exploration of its cavity in the diagnosis of early adenocarcinoma of the body of the uterus, the subjective and objective symptoms, however, are of the utmost importance: not infrequently they are of greater diagnostic value than exploratory curettage, which may at times fail to detect an early carcinoma.

Burckhardt (21) reports four cases when a most thorough curettage revealed no cancer on microscopic examination, but owing to the suspicious subjective and objective symptoms, extirpation of the uterus was practiced in all.

Fig. 5. Case 3 (4,955). Polypoid mass removed by the curettage, all of which show adenocarcinoma.

The extirpated uteri showed, in each case, small carcinomatous area in the angles of the tubes which escaped the curette.

Semon (22) reports a case where a very early carcinoma was situated behind a submucous fibroid and could not be reached in a thorough preliminary curettage.

Dührssen (23) reports a case in which the first several scrapings showed histologically benign endometritis glandularis, but later on in addition to this picture showed typical cancer formation. In this case extirpation of the uterus was done.

CAN UTERINE CARCINOMA BE CURED BY CURETTAGE

Can the complete removal of adenocarcinoma by the curette, without extirpation of the uterus, be regarded as an adequately radical measure? This question, I am convinced, is one surgeons will be called upon to answer more frequently in the future than they have in the past. Does not the experience of the

Fig. 6. Case 3 (4,963). Uterus and pedicle of polypus, sections from which show no adenocarcinoma. Uterus opened anteriorly showing remains of pedicle after removal of a large adenocarcinomatous polyp. Sections from this pedicle and through various portions of the lining of the uterus show no carcinoma.

cases cited above teach us that one positive microscopical diagnosis is worth more than all the negative findings, providing, of course, every care has been taken in the process of establishing the pathological diagnosis, and that to extirpate the uterus, even if a subsequent curettage does not reveal carcinoma, will serve the best interests of the patient?

Both Vassmer and Hess speak of their cases as "permanently cured" because both their patients were free from recurrence for four years. In their cases, extirpation of the uterus could not be done; in the first, because the patient refused an operation, in the second, owing to an accident during the attempt at extirpation.

The freedom from recurrence, clinically speaking, for four or five years presents a strong presumption but no positive assurance that a permanent cure has been effected. I am fully in accord with von Hansemann (14) who maintains that the mere removal of the diseased area does not effect a permanent cure. Even the removal of the diseased area in its incipiency, by the curette, when supplemented by extirpation of the uterus does not protect against a possible recurrence; this is evidenced by the very rapid recurrence in the case of Schroeder, reported above by Rüge and Stratz. On the contrary, the chance of

Fig. 7. Case 3 (4,955). Section of curettings. Microscopic section of typical curettings, showing mixtures of solid and adenocarcinoma. In the lower portion of the field are some smooth muscle fibers.

recurrence is greater when the uterus is left in, since in that case the possibility is always present of a fresh malignant degeneration of its mucosa.

PROGNOSIS

The prognosis in uterine cancer is always exceedingly doubtful owing to the extreme uncertainty and indefiniteness of the course, duration, and manifestation of the disease. While the German statistics show, in carcinoma of the uterus, a ratio of operability of 45 per cent to 60 per cent, and absolute curability of more than 5 years' duration in 20 per cent, the ratio of operability in England, as shown by Wilson (24) of Birmingham, is only 30 per cent to 40 per cent, with absolute curability of 10 per cent. Wilson attributes the low ratio of operability and curability to the same causes we find here in America; viz: that the lay public and the general medical profession do not as yet realize that cancer is curable by radical operation in the early stage.

Fig. 8. Case 3 (4,963). Section from tip of pedicle, showing hæmorrhagic and partly necrotic tissue with dilated blood-vessels but no carcinoma.

Fig. 9. Case 3 (4,963). Section of base of pedicle, showing glands of the normal uterine type imbedded in smooth muscle tissue. Adenomyoma.

When exploratory curettage becomes the rule of practice rather than the exception and when microscopic examination of all curettings becomes a matter of routine, carcinoma of uterus will be diagnosed at an early stage and not when 70 per cent of the cases are inoperable; with early diagnosis the chances for permanent cure will surely be enhanced.

In cancer of the body of the uterus, however, the percentage of absolute curability is from 24 per cent, as given by Wilson in his own series, to 50 per cent as usually claimed.

The fact that the ratio of curability of carcinoma of the body of the uterus is far better than in that of the cervix is no excuse why we should rest content with the removal of the diseased area in carcinoma of the body, when nothing short of a most radical extirpation is accepted as sufficient in the case of carcinoma of the cervix. Ordinary surgical principles demand that a carcinoma be removed with as wide a field as possible from the disease, and it would be contrary to all surgical rules to leave in a uterus, the seat of carcinoma, even if the curette has entirely removed the diseased portion.

In view of the present active and praiseworthy propaganda to familiarize the profession and the laity with the extreme importance of the early recognition of cancer of the uterus, the presentation of these cases is most opportune; it proves the tremendous advantage to be gained in attacking the disease in its incipiency and also serves as a serious warning that cannot be too strongly emphasized on the medical profession as well as among the laity that extirpation by the curette of a young cancer is no cure, but, on the contrary, a positive indication for the radical operation. Moreover, it might be well to point out a danger that von Hansemann emphasized when he said: "If the lay people would be led to believe, by the report of these cases, that curettage is sufficient to cure a carcinoma uteri, they would therefore decline the major operation. If this opinion should become more general

Fig. 10. Case 3 (4,963). Section of uterus. Section from mucosa of uterus showing normal uterine glands imbedded in fibrous stroma.

great injury would be done, because if among the thousands of sufferers from carcinoma uteri there are three in which all traces of carcinoma are removed by the curette, it does not affect the necessity of total extirpation. This operation remains the only necessary treatment when the exploratory curettage reveals carcinoma."

The cancer problem will be solved only when the nature and etiology of the disease are discovered, and the research work that is being carried out with that end in view gives us hope and encouragement that this most important problem will eventually be solved.

Meanwhile the only means at our disposal, with which we can attack the disease and limit its ravages and mortality, is first, the perfecting of the radical operation; and second, devising ways and means by which the disease, in its incipiency, can be suspected by the laity and recognized by the profession. The scope of operative procedure seems to have reached its limit, so that in a practical way our efforts and energies for the present can be directed only toward the question of early diagnosis, and the education of the laity to a realization of the fact that the only hope of effecting a cure rests in the earliest possible diagnosis, and the earliest and most radical operation.

CAN CANCER OF THE BODY OF THE UTERUS BE CURED SPONTANEOUSLY

The only other possible explanation of the disappearance of the evidence of malignancy after curettage to be considered is the theory of spontaneous cure. Vassmer and Hess raise that question in connection with their cases. They cite hundreds of cases of spontaneous cures that have been reported in the literature. Usually, when the word "spontaneous cure" is used thereapeutic means were employed, such as various chemical irritants, the X-ray, etc. It has occasionally happened when a portion of a malignant growth has been removed the remaining neoplasm has undergone retrogressive changes. It was shown by Bier, Lomer, and Theilhaber (25) that an increased blood supply will cause regression in the cancer, and that hæmorrhage will stimulate the hæmatopoietic organs, giving a richer fresh blood supply. Therefore, Hess thinks that the free bleeding during the process of curettage has a lytic effect on the cancer-cells that have escaped the curette. It is known that cancer anti-bodies circulate in the blood and, to a certain extent, tend to prevent the progress of the disease. It is conceivable that in early cases of carcinoma the entire cancer anti-body system has not yet been destroyed; and therefore the excision of a portion of the tumor will render it possible for the remaining cancer anti-bodies to cause a destruction of those cancer rests that have not been removed.

However, spontaneous cure, from a scientific standpoint, has not yet been proved. Theilhaber appears to be the only author who is a firm believer in the theory of spontaneous cure; von Hansemann, on the other hand, considers the spontaneous cure of carcinoma of the uterus as a medical superstition.

The only malignant tumor of which we have a positive record of a spontaneous cure

is chorion epithelioma, and the case of chorion epithelioma reported by me in 1902, which by the way was the first case reported in the literature which was clinically suspected and microscopically diagnosed from the curettings before extirpation, showed distinct signs of metastatic pulmonary emboli, as evidenced by the physical signs, and hæmoptysis; these symptons disappeared spontaneously and the patient remained well for more than ten years.

Hess also considers the question of the latent state of malignancy, as presented by Brettschneider (26), and while we cannot endorse Dr. Brettschneider's theory, there is a great deal of truth in his conclusion, which is embodied in the following quotation:

"Though we are justified in drawing certain conclusions in regard to the prognosis of carcinoma from the histological and anatomical conditions, and from the age of the patient, we must always remember that there are other things, as yet unknown, that may influence the prognosis, and we must always bear this in mind when treating inoperable carcinoma so that such cases may not fall into the hands of quacks, enabling them to get credit which they do not deserve."

And I desire to add that to a certain extent, the same is true of operable cancer, and we are therefore in duty bound to protect the profession and the laity against the individual who is consulted by a patient in whom the evidence of carcinoma of the uterus has been removed by a diagnostic curettage, and makes use of that fact for the purpose of exploiting his ability to cure carcinoma without a radical operation.

In conclusion I beg to acknowledge my sincere gratitude to Dr. Eli Moschcowitz, for the elaborate and painstaking histological, and pathological descriptions of the specimens and sections of my cases, and for the efficient system he has established in the laboratory of Beth Israel Hospital, without which the above report would not have been possible. I also desire to express my sincere thanks to Dr. James Ewing, Dr. W. G. MacCallum, Dr. Francis Carter Wood, Dr. F. M. Jeffries, Dr. Isaac Levin and to Dr. I. C. Rubin for their kindness and courtesy in making pathological studies of my cases, and furnishing me with the appended admirable reports.

BIBLIOGRAPHY

1. Gessner, 1896. Berlin Obstetrical and Gynecological Society, March 13, 1896. Ztschr. f. Geburtsh. u. Gynäk., xxxiv, 387.
2. Veit, 1896. Discussion on above. (Martin's case.)
3. Kieffer, 1896. Discussion on above.
4. P. Rüge. Discussion on above.
5. Krukenberg, 1897. Monatschr. f. Geburtsh. u. Gynäk., v, 138.
6. Von Franque, 1898. Ztschr. f. Geburtsh. u. Gynäk., xxxviii, 65.
7. Zweifel, 1903. Medical Society of Leipzig, 1902. Deutsche med. Wchnschr., v, January 22.
8. Vassmer, 1905. Arch. f. Gynäk., lxxv, 668.
9. Winiwarter, 1910. Vienna Obstetrical and Gynecological Society, December, 1910. Arch. f. Gynäk., xcviii, 1.
10. Chodounsky, 1911. Zentralbl. f. Gynäk., 1913, xxxvii, 441.
11. Ogorek, 1912. Vienna Obstetrical and Gynecological Society, January, 1912. Zentralbl. f. Gynäk., xxxvi, 1088.
12. Graff, January, 1913. Vienna Obstetrical and Gynecological Society. Zentralbl. f. Gynäk., xxxvii, 1038.
13. Hess, May, 1913. Deutsche med. Wchnschr., 1913, xxxix, 1038.
14. Von Hansemann, May, 1913. Deutsche med. Wchnschr., 1913, xxxix, 1040.
15. Prym, May, 1913. Deutsche med. Wchnschr., 1913, xxxix, 1247.
16. Stratz, May, 1913. Zentralbl. f. Gynäk., 1913. xxxvii, 1140.
17. Benthin, June 1913. North German Society for Gynecology.
18. Unterberger, June 1913. North German Society for Gynecology, Königsberg. Monatschr. f. Geburtsh. u. Gynäk., xxxviii, 360.
19. Schottländer. Zentralbl. f. Gynäk., v, xxxvi, ½, p. 88. Am. J. Obst., lxxi, 413.
20. Carstens. Am. J. Obst., lxx, 689.
21. Burckhardt. Ztschr. f. Geburtsh. u. Gynäk., cxxv, 34.
22. Semon. Med. Klin., 1910, September 18.
23. Dührssen. Ztschr. f. Geburtsh. u. Gynäk., 1894, xxx, 486.
24. Wilson. Surg., Gynec. & Obst., 1914, xix, 456.
25. Theilhaber. Deutsche Med. Wchnschr., xxxix, 1314
26. Brettschneider. Monatschr. f. Geburtsh. u. Gynäk., v, 138.

SOME RARE FŒTAL TERATISMS, WITH ILLUSTRATIVE CASES—SYMPODIA, CRANIOPAGUS AND ACEPHALUS[1]

By W. A. NEWMAN DORLAND, A.M., M.D., F.A.C.S., Chicago
Professor of Gynecology, Post-Graduate Medical School; Professor of Obstetrics, Chicago College of Medicine and Surgery

THE specimens I wish to present exemplify the danger to which gemellar pregnancies are subject. It is not my intention at this time to enter into a discussion of the various theories which have been advanced in explanation of the evolution of teratic anomalies, such as fœtal inclusion, the occurrence of fœto-amniotic bands, and the intricate anastomoses and reversals of current in the fœto-placental circulation. In these cases of multiple pregnancies, the struggle for existence begins at a very early stage of intra-uterine life, and the law of the survival of the fittest adduces no more striking illustrations than the remarkable instances of fœtus papyraceous and the other well-known cases of anomalous fœtal development occurring in association with normal embryonic growth. It was my good fortune to have recently acquired for my teratologic collection a number of the rarer teratic conditions, three of which I bring before you now.

1. SYMMELIA (SAINT HILAIRE) OR SYMPODIA (BALLANTYNE)

The first of these is a remarkable example of the condition described by Geoffroy Saint Hilaire as symmelia and by Ballantyne as sympodia, occurring in a twin birth, which was brought to me through the courtesy of Dr. A. E. Gammage. The labor was a normal one in so far as a twin birth may be termed normal. One fœtus was born alive and to all appearance normal in every respect. The twin was the symmelic monster (Fig. 1).

Saint Hilaire divides this group of monsters into three distinct varieties, of which the first is sirenomelia, or sympus apus (Förster), mermaid-like creatures in which the lower portion of the trunk tapers off into a point without any pedal extremity, and with only rudimentary ankle-bones. This is the most common variety. The second group, uromelia, or sympus monopus (Förster), of which my monster is a fine specimen, has present the ankle-bones, and the extremity terminates in a single foot. This is the rarest of the varieties. The third group, symmelia, or sympus dipus (Förster), presents two more or less distinct feet.

Symmelic monsters are "characterized by imperfect development of the pelvis and lower extremities; by *atresia ani et urethræ;* by more or less intimate fusion of the lower extremities; and by a twisting of the lower limbs so that the femora are united by the external condyles, the legs by the fibulæ, and the feet, if they exist, by the fibular edge and little toes, so that the heels look forward" (Hirst and Piersol). In the case of a uromelic monster, such as this specimen, "the fusion of the limbs is more complete and there is but a single foot. The thigh usually shows evidence of double formation, but the leg is single. The foot may be normally formed, imperfect, or may possess six to eight toes. In the last case the big toe is always in the middle, and the heel in all forms is turned forward" (Hirst and Piersol).

In most of the cases of sympodia no trace of the kidneys or bladder can be found; in most of them the external genitalia are absent; and there is generally an absence of the anus and rectum, although there may be a very small indentation in the outer skin to represent the anus. However, Julliard[2] reported a specimen having a perforate rectum and rudimentary external genitalia; while Cichorius's case had a urogenital sinus and an external orifice for the urinary passages. In my specimen the external genitalia are absent, as is also the anal orifice. The fœtus has not been examined anatomically; therefore no report can be made of the internal findings.

Gladstone,[3] speaking of the causation of symmelia, states that "the condition appears

[2] G. Julliard. Gaz. méd. de Par., 1869, xxiv.
[3] Gladstone. Brit. M. J., 1906, ii, 1704.

[1] Read before the Chicago Gynecological Society, December 18 1914. (See discussion, p. 372.

to be due to a fusion of the post-axial borders of the limb-buds over the cloacal area"; and the outward rotation of the limbs appears to be partly caused by the prevention of the normal inward rotation of the lower extremities by the union of their post-axial or peroneal borders, and partly by the approximation of the acetabula due to the flattening of the pelvis.

In the fifteen years since 1900, twenty sympodial monsters, including my specimen, have been reported in the world's literature. Of these, eleven were true sirens (sympus apus), seven were examples of sympus dipus, and only two were uromelic monsters or sympus monopus. The skiagram (Fig. 1) shows clearly the markedly deficient pelvis, to which is attached a single femur, well-developed, and a tibia with its ankle-bones and foot. Apparently there is but a single formation throughout this extremity, contrary to the usual findings.

Fig. 1. Skiagram and photograph of uromelia or sympus monopus. One of twins; its fellow was born alive and is alive to date.

2. CRANIOPAGUS

The second specimen, which I show here —a wonderful example of craniopagus parietalis, belonging to the class of terata anadidyma—was delivered by Dr. S. F. Mirabella in the Columbus Extension Hospital after a labor characterized by extreme dystocia. They are twin girls whose delivery, according to the interne, Dr. Amante Rongetti, was accomplished as follows: The first child presented as a face, and in the efforts which were made to deliver this the head was almost severed from the body and one arm was cut off. The second child was extracted without much difficulty. (Fig. 2.)

"In this form of double monster the two bodies are joined at some homologous portions of their cranial vaults. The junction very rarely involves the brains, but is confined to the skull and scalp. The longitudinal axes of the two bodies are not always parallel, as in thoracopagus, but the pelvic extremities may diverge from one another" (Hirst and Piersol).

The heads may be united by the foreheads —metopagus or craniopagus frontalis—which is the rarest of all forms; by the occipital bones—occipitopagus or craniopagus occipitalis; and by the parietal bones—parietopagus or craniopagus parietalis—the most common variety, which Baudouin calls the true craniopagus. In this variety the heads may be twisted on one another to varying degrees. From this peculiarity Baudouin recognizes four varieties of craniopagus parietalis, as follows:

1. Parietopagus without any twisting, the faces corresponding, as in the case of Joly and Peyrat (1874).

2. Parietopagus with torsion of the bodies:

A. Complete (angle of 180°), the faces looking in opposite directions, as in Villeneuve's case (1829) and in my own specimen (1914).

B. Partial (angle of 90–95°). *a*. Torsion to the right side (as in the case of Versailles, in 1861); *b*. To the left side (as in the case of

Fig. 2. Craniopagus parietalis.

Emi-Lisa Stoll—Baudouin, in 1912). (See Fig. 4).

Saint Hilaire believed that craniopagus did not occur in animals. Since 1836, however, several cases in animals have been observed, particularly in chickens. Thus, Dareste (1861–65), Monezzia (1879), and M. Koch (1883) have published reports of such cases; and what is much more important, Dareste,[1] in the course of his careful investigations, had the good fortune to find in a hen's egg a craniopagus in the process of formation. He has also deposited in the museum at Lille a specimen of craniopagus frontalis occurring in a wolf.

Ahlfeld described twelve examples of craniopagus, seven of which lived for some time after birth. Living and surviving cases of craniopagus, as reported in the literature, are as follows (Baudouin):

[1] C. Dareste: "Recherches sur la production artificielle des monstruosités, ou essais de[l] teratogénie expérimentale," 2d ed., p. 527, pl. xv, fig. 1. Paris, 1891.

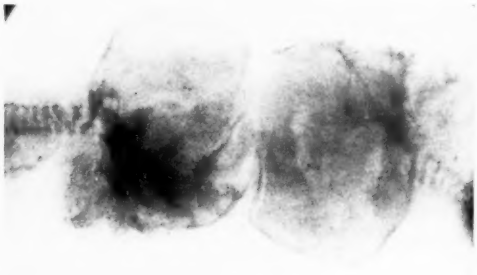


Fig. 3. Skiagram of carniopagus parietalis (Fig. 2).

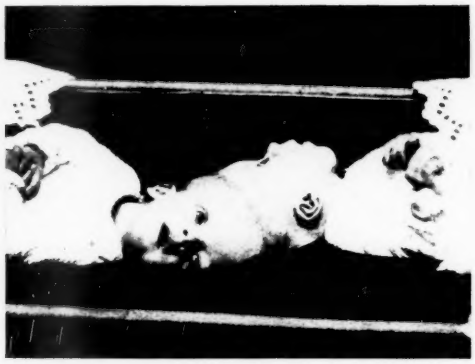


Fig. 4. Baudouin's case of living craniopagus.

1. Case of Lemery, of Blois (1703). These children were baptized, therefore were born alive, after an easy delivery.

2. Case of Albrecht (1733). The children —both females—lived one year.

3. Case of Barkow (1821). Two girls who died at the moment of birth.

4. Case of Villeneuve (1829). Males, born at seven months, and dying almost immediately.

5. Case of Mazurier, of Versailles (1861). The children died on the eighth and ninth days.

6. Case of Louis Blanc (1893). Two girls who survived about five months.

7. Case of Kissinger (1908). Males who survived six days, one dying three hours after the death of the other.

8. Case of Baudouin (1912). Emi-Lisa Stoll, who were still living at the last report.

Warschauer, in 1909, stated that up to that time there had been reported 21 cases of craniopagus, of which 14 were examples of parietalis, 5 examples of occipitalis, and only 2 examples of frontalis, to which he added a third. To these 22 cases must now be added Baudouin's and Bermbach's cases and the case I present tonight, all samples of parietalis, making 25 cases to date, 17 of which, or 68 per cent, were specimens of parietalis.

An interesting question arises as to the possibility of operating upon these children. Baudouin believes that it might be possible to do so in the first or second year, since the brains of these children are distinct. How-

ever, up to the present time the operation has not been attempted. The one essential condition, if any success is to be obtained, according to Baudouin, is that the operation be done before the death of one of the twins.

As the skiagram shows (Fig. 3), there is an absence of the cranial vault in both babies; otherwise the shadow appears to be normal.

3. ACEPHALUS

The third specimen is this curious sample of acephalus thorus, of the class of omphalosites, which was delivered by Dr. Arthur E. Lehner after an easy twin labor at full term. The monstrosity presented first and was followed by the stillborn twin. This was the fifth pregnancy occurring in an American woman 35 years of age. As you can see, to the almost shapeless trunk, which shows the point of attachment of the umbilical cord, are appended two rudimentary limbs, one ending in a peg-leg, and the other in a cloven hoof. (Figs. 5 and 6.)

In acephalous monsters, "there is a complete absence of the head and usually of the upper extremities. The latter may be represented by stumps covered by the skin of the body. Occasionally one upper extremity is present, though not perfect (acephalus monobrachius). Acephalus is the commonest condition among the omphalosites" (Hirst and Piersol). As you all know, "omphalosites are embryos or fœtuses dependent for their imperfect growth in the uterus upon another embryo or fœtus, usually well developed, that supplies the circulation of blood for both by means of extensive and intimate anastomoses of the umbilical and placental vessels."

Breus's theory of their development—that now generally adopted—is as follows: The acardiaci (a name often applied, especially in Germany, to these monsters—from the frequent absence of the heart), on account of early disturbance of their embryonic development, are such highly defective products of conception that they are not capable of an independent circulation nor of an intrauterine nutrition." They continue to develop and to grow, however, because a supplementary circulation maintains their tissues in a living and growing state. "They are

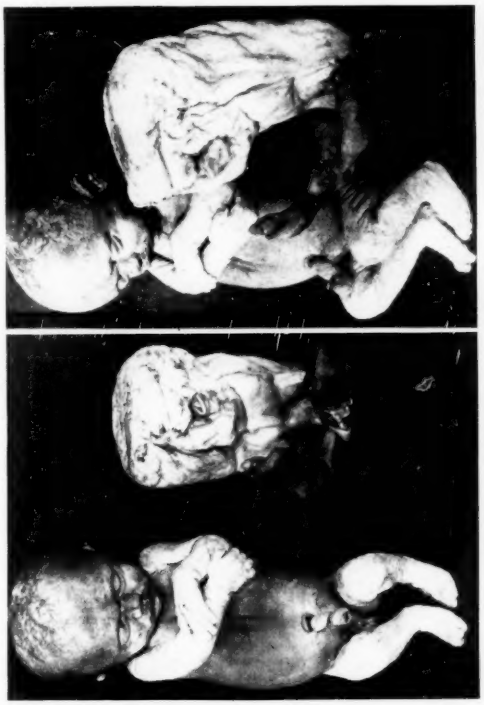


Fig. 5 (below). Stillborn twins; one normal, the other acephalus thorus, more properly cryptocephalus.
Fig. 6 (above). Side view of case shown in Fig. 5.

usually found in twin labors together with a normal fœtus, for under these circumstances, by anastomoses of the umbilical vessels of both fœtuses, the vicarious circulation is most easily established."

According to this theory, then, the omphalosite dies, and, no longer possessing an independent circulation, is nourished imperfectly by the blood-current of the autosite. The infrequency of the monster would seem to controvert the theory of reversal of the blood-current by a stronger (the theory of Claudius and Ahlfeld); for, as Breus has indicated, omphalositic monsters should be very common if their production depended upon such a reversal, since in all unioval twins anastomoses between the vessels of the two cords are invariably demonstrable, and one fœtus is usually better developed than the other.

Fig. 7. Skiagram of Dorland's case of acephalus thorus, more properly cryptocephalus, showing well defined head-bones.

Ahlfeld collected fourteen cases of acephalus in which the heart was present in some degree of development, and in some cases, was functionally active until birth, as proved by the presence of trabeculæ carneæ. The term acardiacus is, therefore, inappropriate.

The characteristics of acephalous monsters are as follows: The parasite is usually born last with the placenta. Œdema of its tissues is almost constantly noted. There is an overgrowth of connective tissue, especially subcutaneously, and in this situation there are developed lacunæ and cysts. There is always a median fissure of the thorax, and the thoracic organs are absent or very defective. The abdominal and pelvic organs are best developed—a point that favors the theory of reversal of the circulation, since in that condition the lower portion of the body receives first the freshly aërated blood. The genito-urinary apparatus is usually well developed. The umbilical cord is inserted in the middle of the very short belly, and there is frequently a hernia into the cord. There is but one placenta, and usually two anmiotic cavities.

The skiagram (Fig. 7) of this remarkable specimen presents a very unusual appearance, and the case is probably unique in the annals of obstetrics. As may be clearly seen, not only are some of the ribs and the thoracic spinal column well developed, but there are also present the cervical vertebræ and a portion, if not all, of the cranial vault. The sagittal suture may be clearly traced, and the outlines of the parietal and occipital bones, with the small fontanel, are very distinct. Less marked, but still readily defined are the frontal, malar and maxiilary bones. As far as I know this is the only instance on record in which head-bones have been noted as being included in the body-tissues of these acephalous monsters.

Since 1900 there have been reported in the world's literature twenty-seven cases of acephalus, including the specimen presented tonight; and in none of these, and certainly in none of the specimens recorded prior to 1900, have head-bones been noted. It would appear, therefore, that there must be described two distinct varieties of the so-called acephalous monsters—one in which no head-bones are to be found, the group acephalus proper; and secondly, those cases in which a head, or head-bones, will be found enclosed in the thorax, to which the term cryptocephalus should be applied.

Just how such a curious condition could occur it is difficult to conceive. A plausible explanation would appear to be the following: The smaller fœtus dying in early intra-uterine existence, the nourishment of the tissues of the dead product is assumed by the autosite, or living fœtus, through the interfunic anastomoses. There then results a growth of the lowest grade of tissue, cellular connective tissue, in the deceased embryo; and this tissue develops up and over the neck and head of the dead product, incasing these, as it were, in a mesh of new-formed substance, and totally concealing them, so that from a superficial examination the monster appears to be headless.

BIBLIOGRAPHY

SYMPODIA

1. Abramow, S., and Rjesanow, M. Ein Fall von Sirenenbildung (Sympus apus). Arch. f. path. Anat., 1903, clxxi. 284.

2. ALEZAIS and RISS. Monstre symèle ectromèle. Marseille méd., 1907, xliv, 234.
3. AUDEBERT. Monstre symélien. Toulouse méd., 1903, 2d series, v, 129.
4. BAUEREISEN. Eine typische Sirenenbildung. München. med. Wchnschr., 1905, lii, 721.
5. CICHORIUS. Ein Fall von Sirenenbildung (Sympus dipus). Arch. f. Gynäk., 1904, lxxii, 571.
6. GLADSTONE, R. J. A symelian monster (Sympus dipus). Brit. M. J., 1906, ii, 1704.
7. HOWELL, W. S. Symelus. Am. J. Obst., N. Y., 1909, lx, 914.
8. KAUFMANN, H. Zur Kasuistik- und Genese der Sirenenmissbildungen. Strassb., 1911, Elsass-Lothr. Druck. 18 p.
9. KOCH, M. Beschreibung einer Sirenomele (Sympus apus). Charité-Ann., Berlin, 1905, xxix, 410.
10. KOLCHIN, P. F. Origin of sympodia. St. Petersb. 1904.
11. KULIGA, P. Über Sirenenmissbildungen und ihre Genese. Monatschr. f. Geburtsh. u. Gynäk., 1908, xxvii, 297; 468.
12. MAYGRIER, C. Présentation d'un monstre symèle (moulage et squellette) Sympus monopus. Bull. Soc. d'obst. de Par., 1907, x, 311.
13. MOORHEAD, T. G. The anatomy of a sirenomelian monster (sympus apus). J. Anat. and Physiol., 1905, xxxix, 450.
14. NEALE L. E., and ELDERDICE, J. M. Symelus. Hosp. Bull., Univ. Maryland, Balt., 1911, vii, 49.
15. NIEMEIJER, M. Sireenvorm of sympodia (zeemeermin). Tydschr. v. prakt. verlosk., Haarlem, 1909, xiii, 113.
16. POROSKIN, M. N. Sympus apus. J. akush i jensk. boliez., St. Petersburg, 1904, xviii, 89.
17. RABAUD, E. Essai sur le symélie; son évolution embryonnaire et ses affinites naturelles. Bull. Soc. philomat. de Par., 1902–3, q. s. v., 25.
18. SINGER, L. U. A case of Sympus (or Symmelus) dipus. St. Louis M. Rev., 1906, liv, 405.
19. VEIL, O. Über Sympodie. Anat. Hefte., Wiesbaden, 1908, xxxviii, 63.

CRANIOPAGUS

1. BAUDOUIN, M. Un nouveau craniopage vivant. Sémaine med., Par., 1913, xxxiii, 553.
2. BERMBACH. Eine ausserordentlich seltene Missbildung [Mit dem Kopf zusammen gewachsene Zwillinge]. Aerztl. Sachverst. Ztg., Berl, 1913, xix, 321.
3. KISSINGER, P. Ein Fall von Craniopagus parietalis. Med. Klin., Berl., 1908, iv, 1681.
4. WARSCHAUER, O. Ein Beitrag zur Kenntnis des craniopagus frontalis. Arch f. Gynäk., 1909, lxxxix, 498.

ACEPHALUS

1. ANDERSON, J. Acephalic monster (five months) with numerous developmental defects. Glasgow M. J., 1903, lx, 60.
2. BAUEREISEN, A. Über Acardius. Arch. f. Gynäk., 1905, lxxvii, 557; 580.
3. BRUYNEEL, E. Note sur un fœtus holoacardius acephalus. Bull. Soc. de méd. de Gard., 1909, lxxvi, 31.
4. BUDDE, A. E. A case of holoacardius acephalus. J. Mich. M. Soc., 1910, ix, 446.
5. CAMPBELL, M., and SHEPHERD, H. D. The circulatory and anatomical abnormalities of an acardiac fœtus of rare form. Lancet, Lond., 1905, ii, 941.
6. FONYO, J. Acardius acephalus. Budapesti orv. ujsag., 1913, xi, 231.
7. GLADSTONE, R. J. Acardiac fœtus (acephalus omphalositicus). Proc. Anat. Soc. Gr. Brit. and Ireland, 1905, p. xxv. Also J. Anat. and Physiol., 1905, xl, 71.
8. GOWDEY, A. C. A note on a rare case of acephalic monster. J. Obst. and Gynec., Brit. Emp., 1904, vi, 384.
9. HEIJL, C. F. Ett fall af acardius amorphus. Hygiea, Stockholm, 1910, 2. f., x, 747.
10. IBID. Über Acardii; zur Frage von den Drillingsmissgeburten. Nord. med. Ark., Stockholm, 1912, 3. f., xii, afd. 1, No. 2, 51.
11. IBID. Weitere Untersuchungen über die akardialen Missgeburten. Frankf. Ztschr. f. Path., Wiesbaden, 1913, xiii, 411.
12. HOCHHEIMER, J. G. Ein Fall von Acardius acephalus bipus. München, 1904.
13. HUNZIKER, H. Beitrag zur Lehre vom Acardiacus amorphus. Beitr. z. Geburtsh. u. Gynäk., 1907, xi, 385.
14. JACKSON, H. A case of holoacardius acephalus. Tr. Chicago Path. Soc., 1909, viii, 19.
15. KONOPACKI, M. Acardius acephalus beim Menschen. Zent. f. allg. Path. u. path. Anat., 1910, xxi, 772.
16. KRÜGER, M. Acardie und acutes Hydramnion. Arch. f. Gynäk., 1909, lxxxvii, 586.
17. LESBRE and FORGEOT. Étude anatomique de divers omphalosites, suivie d'un projet de réform de la classification des monstres de cette famille. Bull. Soc. centr. de med. vét., Paris, 1906, lx, 163.
18. MAGNAN and PERRILLIAT. Sur un monstre humain acéphale. Compt. rend. Acad. d. sc., Par., 1910, cli, 722.
19. MEYER, R. Über einen Holocardius acephalus (sog. Amorphus). Virchow's Arch. f. path. Anat., 1908, xix, 371.
20. MOCHULSKI, S. A. Acardiac monster. Kharkov. M. J., 1912, xiii, 435.
21. NACKE and BENDA, C. Schwere Geburt Eines Acardius acephalus mit Herz-rudiment (Hemitherium posterius). Zentralbl. f. Gynäk., 1907, xxxi, 468.
22. OSBORNE, A. J. An example of acephaly. Old Dominion J. M. & S., Richmond, 1909, viii, 328.
23. RISEL. Zwei Acardii amorphi. Deutsche med. Wchnschr., 1913, xxxix, 1572.
24. SCHLANK, J. Acephalous, acardiac fetus. Gaz. lék. Warczawa, 1911, 2d. series, xxxi, 1215.
25. SCHUHL. Présentation d'un monstre acéphalien. Rev. méd. de l'est, 1904, xxxvi, 743.
26. STREIT, B., and WEGELIN. Über einen Fall von Holoacardius. Monatsch. f. Geburtsh. u. Gynäk., 1912, xxxv, 589.
27. TRILLAT and JARRICOT. Un monstre humain acardiaque d'un type douteux (hémisome inférieur). Compt. rend. Soc. de biol., Par., 1907, lxii, 642.

DEPARTMENT OF TECHNIQUE

THE LATEST WORD ON THE SUBJECT OF SCOPOLAMINE SEMI-NARCOSIS

By GEORGE CLARK MOSHER, A.M., M.D., Kansas City, Missouri

IN order to verify or disprove the claims made in recent society reports and medical journals concerning the value of the Freiburg method, a special trip was undertaken by the writer, who spent November and the early days of December in visiting various points where the scopolamine treatment has been carried on to any extent in this country. The itinerary included a number of hospitals in several cities. Georgetown Hospital at Washington, D. C., where Dr. Henry D. Fry has been using it since July in his charity service, was first visited. Five cases were under treatment or in their puerperal stage. He has not yet adopted the method in private practice. His results have been generally satisfactory. He has noticed neither fœtal asphyxia, delay in labor, nor hæmorrhage. He is not yet ready to make a report as to his conclusions.

At Johns Hopkins, Dr. Ploss, under Dr. J. Whitridge Williams is trying out a series of cases. Dr. Williams believes the Freiburg technique should not be condemned but is entitled to be tried out in a scientific spirit.

The Jewish Maternity Hospital in New York has on its records 380 cases of patients delivered under scopolamine. The story of the three cases of insanity reported in the newspapers was there explained. The first case had been twice before delivered. She developed puerperal mania with each labor so this was her third attack of derangement. In neither of her former labors did she have scopolamine. She was sent to the asylum. The second case was a woman with delusions *who did not have twilight*, but insisted she had been given it. The third case was one which was being given the treatment at the Jewish Maternity the night Nathan Strauss, the philanthropist, and Arthur Brisbane, the newspaper correspondent, were making the round of the Jewish quarter in the Lower East Side. As they entered the room where the case was just starting in labor, the patient, startled by seeing strangers in the room, reached up and slapped the face of the nurse. She was put into the ambulance and sent to the psychopathic ward at Bellevue. She was discharged next morning as cured. Dr. Scorber of the hospital staff who related the cases was in charge of the last two. Two other cases of mental symptoms have occurred at the Jewish Maternity this fall, neither of which had scopolamine.

Dr. J. Clifton Edgar of the Bellevue Hospital is reported in a newspaper interview to have said insanity does not result from the use of the drug.

Dr. J. O. Polak of Brooklyn has had sixty-three cases. These were in the Jewish of Brooklyn, the Methodist, and the Long Island hospitals. He had three cases of asphyxia of the newborn, but no mortality. All of these were in private patients. In thirty-six cases, one series, low forceps delivery was done eight times. He does not approve of the Siegel method which was put into effect at Freiburg by Dr. Siegel after Krönig and Gauss went to the front. This modification depends on the routine use of narcophin or morphine throughout the case, and was used at the New York Post-Graduate Hospital by Dr. Brodhead in a series of twenty-eight cases, in several of which there was more or less fœtal asphyxia.

Dr. Asa Davis expresses himself as being neutral. He deplored, as every one does, the magazine and newspaper notoriety, not to mention department store enterprise, advising women what to demand of their medical advisors. Dr. George W. Kosmak, one of the editors of the *American Journal of Obstetrics*, felt the exploitation of a drug by these commercial means would induce many men, without experience or preparation, to use the treatment.

Dr. W. H. W. Knipe of Gouverneur Hospital, who spent the summer in Freiburg, adopts the Gauss method rigidly in his service. He includes the use of the imported drug which is put up by the hospital druggist with mannet to prevent deterioration to which much of the ill effect has been attributed. Dr. Knipe has his

patient up early, say the third day, and out of hospital the fifth in accord with the Freiburg routine. These patients are given exercises the first day and increased the second. He is not yet ready to report his conclusions. About seventy-five cases have been treated at Gouverneur and no mortality has occurred. Twelve cases were in the wards and interviewed, each of whom replied in response to inquiry that if she were to be again confined that she would want twilight — because she had no pain. As a matter of fact those who were seen seemed to undergo the same suffering that patients experience under ordinary treatment, but with varying degrees of amnesia forget it subsequently.

At the Lying-In Hospital the cases of scopolamine have been largely in the service of Dr. Harrar and Dr. McPherson. The former explained that the method was undertaken for the purpose of counteracting an ill-advised wave of lay enthusiasm which was sweeping over the country by demonstrating that the treatment was not a success. Dr. McPherson said they held no brief for the system, but are still of open mind. The results attained thus far have so satisfied them that they are continuing the observation until they are finally convinced. They are certainly not condemning the treatment on the present findings. The average number of injections at the Lying-In has been four. The last two cases seen by the writer took, respectively, eight and eleven doses for complete amnesia. Sixty-five cases had been given the treatment since the report at the American Association of Obstetricians at Buffalo. No untoward effects have been observed.

The attending and resident men in the various hospitals visited are generally conservative in their attitude toward the Freiburg method although in some instances intensely enthusiastic. They were all most certainly courteous in the way they received the writer.

An exceptional opportunity to hear the views pro and con was afforded on the night of November 24, when a meeting of the Obstetrical Section of the New York Academy of Medicine was held, which was called at the request of the Committee on Hospitals and Health of the Academy to consider the attitude which the Academy should take toward the subject. As the session was executive, nothing should be published of the transactions until the Academy officially gives out its report.

The conclusions drawn by the writer after the unusual opportunity to investigate the Freiburg method as applied in this country are not different from those given in the paper published in the December number of the *Journal of the Kansas Medical Society*. It is a hospital procedure and not universally successful. It can be safely used only by those who have been especially trained. Rigid adherence to the Krönig technique must be enjoined, otherwise failures should not be charged to it. As to hæmorrhage, unusual necessity for forceps, fœtal asphyxia, or after-results of untoward nature, they were not observed in the cases it has been the good fortune of the writer to have witnessed.

On the other hand no caution is too extreme nor faithful watchfulness too exacting in the protection of mother and child, and no obstetrician should undertake the treatment unless he is willing to devote his entire time to the individual case after the first dose is administered until the labor is terminated.

There can be no doubt that the final benefit to be derived from this remarkable discussion will be that obstetrics will be put on a plane of dignity in the eyes of the laity as well as the general medical profession. Our work will again be classed as one of the three great departments of medicine. It must emphasize the need of maternity hospital service up to the standard of the Chicago Lying-In, the Sloane, and the New York Lying-In hospitals in every metropolitan community in this country.

THORACOTOMY IN UNRESOLVED PNEUMONIA[1]

By RANDOLPH WINSLOW, M.D., Baltimore, Maryland

As a result of accident, and more or less of mistaken diagnosis, I have had two experiences that have been of such interest to me that I wish to present the details of the cases to you for your consideration and criticism.

Case 1. Several years ago a boy 16 years of age was brought from the country to the University Hospital, Baltimore. He had had an attack of acute lobar pneumonia, but his symptoms did not cease, and he was brought to the city for treatment. He was running a high and irregular temperature and had such physical and other signs that it was thought he must have empyema. Aspiration, however, failed to locate pus. As he did not improve under treatment it was thought he must have an encapsulated collection of pus within the pleural cavity and a thoracotomy was decided on. Under gas and oxygen anæsthesia the chest was opened but no purulent collection could be found; the lung was hard, non-collapsible and with adhesions to the chest-wall. The adhesions were broken up and a drainage tube placed in the pleural cavity for a few days. Almost immediately the temperature fell to normal, and in a short time he was convalescent.

Case 2. Mr. S., age 34, entered University Hospital on January 7, 1914. He was suffering with a suppurating lump in his left groin and desired its removal. This lump had been present two years, was not painful, but had suppurated and had been incised several times. He had no gonorrhœal infection or other genital lesion, and the swelling was thought to be tuberculous and so proved to be on removal. His pulse and temperature were normal, the leucocyte count 8,200 and hæmoglobin 95 per cent.

On January 8, 1914, a complete removal of the glands was done under ether anæsthesia. Following the operation he did well for several days and then was taken with severe pain in the thorax, with friction murmur on the left side, indicating pleurisy, and gradual consolidation of the lung, as shown by pectoriloquy, bronchophony, cough, expectoration, and the usual signs of pneumonia. His temperature was irregular, varying from normal to 105°, with chills and sweats, pulse 120 to 140 per minute. On January 26 there was a leucocytosis of 23,600. No malarial parasites could be found. It was feared that he had pyemia. Aspiration failed to find any collection of pus, but as his symptoms continued without improvement it was determined to explore the left pleural cavity. This was done on February 14, under nitrous oxide and oxygen anæsthesia. No pus was found, but the hard and consolidated lung was extensively adherent to the chest-wall. These adhesions were broken up and tube drainage instituted. In a few days there was an improvement in his condition and on March 4 his temperature became normal. On March 14 he left the hospital for his home in North Carolina, and soon was able to resume his work.

In cases of acute croupous pneumonia resolution ought to occur about the tenth day, when the temperature drops and convalesence begins. When the temperature remains elevated and irregular after this period it is a cause of great apprehension. It may mean acute tuberculosis, but usually it indicates empyema. In such conditions it is proper to aspirate the chest and seek to locate the pus, but even if we do not find pus I think the pleural cavity should be opened and explored and drainage tubes inserted.

This was the treatment adopted in the cases reported after ample time had been given for a spontaneous recovery.

Whether the improvement in these two cases was merely a coincidence and not a sequence of the treatment I do not know, but I do know that they were progressing unfavorably before the operation and speedily became convalescent after it. Whether the improvement was due to the loosening of the adhesions or to the drainage of the pleural sac, though there was nothing to drain, I do not know. We know that improvement and cure follow the injection of gases and air in some cases of tuberculosis. May it not be that the benefit observed in these cases of unresolved pneumonia was due to the entrance of air into the pleural cavity, causing increased atmospheric pressure on the lung?

[1] Read before the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 15–17, 1914.

SUCCESSFUL TREATMENT OF A BICHLORIDE POISONING CASE BY HYDRAULIC IRRIGATION THROUGH CÆCOSTOMY OPERATION

By J. HARTLEY ANDERSON, M.D., F.A.C.S., Pittsburgh
Surgeon Western Pennsylvania Hospital

In view of the widespread use of bichloride of mercury and the number of fatalities from poisoning, any new method which is suggested may merit at least a trial in suitable cases, if it is reasonable and well founded. The history of the case and treatment chart is preceded by a brief toxicological résumé. A résumé of the toxicology of acute bichloride of

[1] Read before the Southern Surgical and Gynecological Association, Asheville, North Carolina ,December 15-17, 1914.

CHART I. MABELL D. JULY 21, 1914. CLINICAL REPORT FOLLOWING OPERATION

	Water into Cæcum	Water out of Rectal Tube	Catheterize Urine	Involuntary Micturition.	Urine Analysis	Fæces and Drainage Examination for Mercury	Blood pressure
July 21	736	903	No record of oz.; large quantity	Increased quantity overflow.	1,009; few epethelial cells; white blood corpuscles; acid reaction	Specimens lost by nurse	
22	736	310	130	Large quantity			
23	940	470	30	Large quantity	Urea .003 per ccm.		
24	190	135	65	Large quantity	Mercury absent	Mercury absent	
25	384	288	9	Large quantity		Trace of mercury	Systolic 135 Diastolic 75
26	192	192	4	Large quantity			
27	192	68	3	Large quantity	Trace albumin; red blood corpuscles; white blood corpuscles	Mercury absent	Systolic 100 Diastolic 55
28	64	64	2	Small quantity	Mercury absent; 1,007 epithelial cells; white blood corpuscles	Mercury, faint trace	
29	0	0	⅜	Small quantity			
30	64	56	3	Small quantity	Trace of albumin; few white blood corpuscles; red blood corpuscles; no casts.		
31	80	34	3¼	Large quantity	Faint trace albumin occurred; white blood corpuscles; alkali	Trace of mercury (11th day)	
Aug. 1	128	76	5	Large quantity	Acid; epithelial cells; white blood corpuscles; mucous		
2	384	235	2	Large quantity			
3	96	85	9	Large quantity	1,018 acid epithelial cells few; albumin negative; sugar negative		
4	Stopped	Tube removed	16	Voluntary micturition. Enuresis stopped. q. s.	1,023 albumin and sugar negative; alkali; white blood corpuscles few		
5			14 Stopped	Voluntary micturition. Enuresis stopped. q. s.			
6				Voluntary. 65 oz.			

mercury poisoning shows the following points: A fatal dose taken by the mouth or absorbed by injection is 3 to 5 grains. Recovery has taken place by the prompt effects of emetics and albumen from much larger doses taken by the mouth. Hence the question of the absorption by reason of the solubility and diffusion is paramount for emetic, washing, and antidote treatment.

Clinical pathology: A study of the course and lesions of poisoning shows the immediate absorption into the blood, temporary deposit in all tissues, resecretion of mercury salts into and inflammation of mucosa of certain areas of the alimentary canal, severe renal inflammation, weakness of heart muscle, and blood destruction.

The intensity of the inflammation in the lower third of the ileum and ascending colon, the serous or blood diarrhœa, and the bloody albuminous urine, attracted my attention. As the nephritis increases the quantity of urine diminishes until the third or fourth day, when there is a total anuria. There is a period of quiescence and apparent improvement; then out of a clear sky the fatal symptoms of weakness and collapse happen. In the early stages the kidney is enlarged and œdematous by a diffused inflammation. Decompression by incision or decapsulation relieves the circulatory arrest and some secretion of urine usually follows. The conclusions of statistics and experiments on animals is discouraging in this line of mercury treatment.

The clinical symptoms of anuria are very deceiving. We do not have the preliminary symptoms of uræmia of medical nephritis. The mind may be clear and the patient comfortable, until the heart muscle is weakened to the breaking point, by circulatory changes caused by the reabsorbed mercury. Reabsorption and resecretion take place in the alimentary tract, particularly the colon, and the patient dies more from the toxic effects of the mercury than from uræmia, although that has yet to be decided.

The clinical symptoms of poison of large, medium, and small doses are too well known to need repetition.

Distribution and elimination may be briefly stated as follows:

1. The distribution of mercury bichloride in the tissues is not well studied so far as I am aware. That of calomel is better known. Suffice to say that mercury elimination takes place largely by the stools and vomit.

2. The deposit of metallic mercury in the tissues has been affirmed by Taylor. These accumulations are non-toxic and require further study.

3. The iodide, oxide, and sulphide, as well as the albuminate, are only temporarily insoluble in the tissues.

4. The alkaline chlorides, as common salt solution, should not be used in treatment of bichloride cases, because of disease of the kidney and heart muscle, and because it increases the solubility of mercury. For irrigation and intravenous stimulations 20 per cent dextrose and glucose solutions are less dangerous and more useful.

5. The mercury in circulation cannot be precipitated by any known chemical intravenous method.

The answer to the question of restoring secretion and elimination of kidney by the operation of decapsulation is shown partially by report of two cases by Tisserand. "Decapsulation of kidney for acute toxic nephritis with anuria, followed by reëstablishing secretion, both patients succumbed to the poison."

CASE 1. Female, aged 23, absorbed 2 gm. of cyanate of Hg. On the fourth day anuria was complete. At that stage decapsulation of the right kidney was performed. The kidney was enormous and very congested. After the operation the secretion of urine was 15 ccm.; second day, 120; third and fourth, 300. The patient died on the fifth day, or ninth day of disease, in spite of the reappearance of the urine.

CASE 2. Female, aged 24. Intoxication by sublimate. Anuria beginning the fifth day. Decapsulation of the right kidney, which was very large and congested on the tenth day. Injection of glucose serum. Urine 75 ccm. first day. Many spontaneous urinations afterwards. Progressive weakness followed and then death on the tenth day after decapsulation.

Autopsy. Right kidney (operated) appeared normal, but the left gray and congested.

In spite of the unsuccessful issue in the two cases, the author considers that the question of decapsulation must be further considered as a curative agent.

When I first performed the operation of decapsulation of the kidney in 1893, it was for anuria from an infected kidney. Diuresis was produced, and I have been hoping to prove its value in mercurial nephritis. After a careful study of acute congestion of the kidneys for over twenty years, I am convinced that acute non-secreting kidney is not the starting point for bichloride poisoning. Anuria may exist for a number of days and still the patient recover, providing the cause of inflammation has been eliminated or diminished. The study of "provoked polyuria" by Albarran demonstrated the work which may be accomplished by diseased kidney tubules.

When the following opportunity arrived, I put in practice a long thought of scheme for treating bichloride poisoning.

M. D. H.No. 8,787, age 19, female. U. S., single. Admitted to Dr. M. C. Cameron's medical service, 8:30 A.M., July 21, 1914. Chief complaint: Pain in epigastrium and over the entire abdomen; sore throat. Patient had taken 10 gr. (one and one-half large bichloride tablets,) having crushed the tablets finely and swallowed them with a glass of water, at 6 A.M., on empty stomach. Previous history. Scarlet fever when a child. For eight years had tubercular disease of the right hip and knee. Had been operated upon at St. Francis Hospital for flail joint. Present history. Brought in to the West Penn Hospital at 8:30 A.M. She had tried to swallow raw eggs but had failed. Stomach was washed out with milk, by interne. Case was transferred to me by Dr. Cameron on the evening of the 21st.

Symptoms. Acute pharyngitis, glossitis, painful œsophagus and stomach, severe pain in abdomen and bowels, and bloody diarrhœa. Relief by morphine. Total supression of the urine except few drops of bloody serum found in the bladder.

The evening of the 21st of July I gained consent for an operation. Ether was given and cæcostomy performed, sewing in a rectal tube so that it fit tightly, and the following treatment was carried out. An irrigating can was hung six inches above the patient and a rectal tube inserted in the rectum and the other end placed in a bucket under the bed.

Continuous irrigation of the colon with warm plain water, to which at various times several agents were added to try their value, but from which no deductions were made. These were calcium sulphide, gr. 5 to quart first day; potassium iodide, gr. 5 to quart on second and fourth days, and after fifth day 5 per cent glucose solution for its nutrient and hypertonic effect. Russian oil was given every two hours by mouth, and 4 oz. by cæcostomy, three times a day for protective, antiseptic, and emollient effect.

The large quantity of water used (5 to 10 gallons) had the following effect: First, of washing the colon; second, diluting the mercury in all the secretions of the body and diminishing the local effect of mercury on the kidney, elevating the blood-pressure, allaying thirst, etc.

A fairly constant blood-pressure was maintained; on the fifth day systolic, 135; diastolic, 75; seventh day systolic, 100; diastolic, 55.

The pulse was rapid and weak at first, but improved after five to eight days. The rate was as high as 130 on third day, gradually improving to 110, and after three weeks to normal. The temperature on the fourth day was 99½°; usually it was subnormal.

The interesting results in the treatment are the urinary effects and of the large quantity of water in the colon (see Chart I). After the first day the colon flow was given intermittently. *When the colon was full of water under pressure, the kidneys would secrete copiously; when the flow stopped not a drop of urine would appear. The total quantity of water secreted by the previously anuric kidney was surprising.* As a result we had a continuous overflow of the bladder; it was impossible to ascertain how much was secreted, as the nurses would fail to catheterize often enough, and it was lost in the bed. It will be noticed, in the report, that the quantity of water passed by rectum varied very much. It was lost in one way or another by the overflow of vessels and through other nursing difficulties. The first day 736 ounces of water was given by tube and 900 ounces by rectum, but the tubes did not show the true state of affairs. Some water was given and not recorded. The quantity was always less by rectum except on the 26th. Much urine was lost. For fourteen days irrigation was carried on in this manner except for two days (28th and 29th), when the tube permitted a leak in the cæcostomy. The free secretions of the kidney recurred.

The urinary findings are interesting. From total anuria before the operation the quantity rose rapidly in the first twenty-four hours. The record was lost of the quantity as sent to the laboratory, except the nurse reported that it began shortly after the operation. On the second day 130 ounces were recovered by catheterization; the rest was lost in bed. The urine was examined for mercury and none found. The chart shows the daily quantities. Urine reports following the operation:

July 22, 1,009—Acid. Few epithelial cells. Mercury negative.

July 23—Urea .003 gr. per 1 ccm. Negative for mercury.

July 24—Mercury absent in the urine.

The most that was found was traces of albumin, epithelial cells, white blood corpuscles, red blood corpuscles, until the end of about fourteen days, when traces of inflammation had subsided. *No mercury was found in the watery urine.*

The fæces were examined by Dr. Rosenbloom on the July 25 and mercury was present; on the 27th mercury was absent; on the 28th it was found and on the 31st it was present. You will note that *all mercury found was in the fæces, and that as late as the 31st of July, or tenth day.*

Stomach analysis on the 31st shows free acid absent, total acidity equal to 24 ccm. of decinormal sodii hydrox, an increase of mucus, and blood was present. No mercury.

The cæcostomy was closed on August 14, 1914, but reopened. Was closed on August 21, 1914, and has remained closed. Patient's present condition is good. Mercury seemed to benefit her tuberculosis; either mercury benefited her or the improvement was due to irrigation of the bowels or to rest in bed. She eats everything; there is no sign of stricture of the œsophagus or ulcer of the stomach. Otitis media occurred during convalescence.

She has been on Blaud's pills for some time and she has now a good color. Urine since closing of the cæcum:

September 5, specific gravity 1,017; negative for albumin; sugar absent; some epithelial cells and white blood corpuscles. September 19, specific gravity 1,019; acid reaction; no albumin; sugar absent; many white blood corpuscles. September 30, specific gravity 1,017; normal; no albumin; sugar absent; epithelial cells.

I have watched the urine for two months now to determine if reduced mercury in any quantity might be remaining in the tissues and cause recrudescence of intoxication.

There is one question in this case, as in all poison cases and that is as to the quantity of mercury absorbed in 2½ hours before the antidote was given. Would this quantity have produced fatal results had we not made use of hydraulic irrigation? Quantitative analysis was not made of the gastric lavage nor of the first washings of the colon, owing to a misunderstanding of attendants. One proof that a quantity was retained is shown by a trace found as late as the tenth day.

In cases where large quantities are ingested I think again I would make the fistula in the ileum so as to include the lower third. If the urine was not secreting after the third or fourth day of irrigation, I would advise decapsulation of both kidneys in addition. Decapsulation does relieve tension and urine does flow afterward. The stomach may be washed out repeatedly by syphon, so that gastrostomy will hardly ever be necessary unless the patient were insane or having œsophageal hæmorrhages. A very important protective agent is paraffin oil It certainly relieves the burning gastric pain. I have previously employed it in ulcer of the stomach and had the same experience with it. It relieves the intestinal colic and rectal tenesmus in the same manner.

After the usual treatment of emetics and cathartics associated with the use of antidotes, as milk, eggs, and magnesia, and the use of glucose serum intravenously for the shock, and in cases in which there is reason to suspect absorption of mercury in a dose sufficient to inflame the mucosa of the intestinal tract, and the renal tissue producing anuria and the general toxic effect on the other vital organs, and cases in which resecretion and reabsorption occur in the colon, as I believe it does, I would conclude that early cæcostomy and hydraulic irrigation is the most efficient and logical treatment.

I cannot find that the treatment has ever been suggested or tried before. Hence the reason for publication.

EXTRAPERITONEAL CÆSAREAN SECTION

With a Report of Two Cases

By J. STUART LAWRANCE, M. D., L. M. (Rot.), Greensburg, Pennsylvania
Obstetrician to the Westmoreland Hospital

IN his instructive paper on cæsarean section, Nicholson (1) speaks of the scarcity of case reports in the American literature, and his statement prompts me to report two cases which have come under my observation. Additional interest is attached to the cases because infection was demonstrated in both.

In spite of the present widespread knowledge as to the dangers attached to attempts at dilating the cervix, in spite of the knowledge of the dangers brought about by repeated attempts at delivery and by repeated examinations even by physicians who do know how to be clean, the obstetrician still finds that most of the cases of contracted pelves come to him in a condition that renders the classical operation impossible. This is especially true in localities where midwives attend a great number of the cases.

The mortality of the classical was high until twenty years ago, but since the advent of asepsis it has been decreasing. In the last ten years the causes of mortality have been critically studied. Routh (2) has tabulated the mortality in year periods as follows:

TABLE I

1890	1891–1910	1905–1910	1905–1910 Clean
35.7%	11.6%	6.1%	2.9%

This table shows the decline in mortality as progress in asepsis increased. Statistics covering various periods since 1883 show also how high the mortality was, despite the progress in aseptic operative technique, until the condition of the patient as regards infection received broader attention. From 1890 to 1905 Routh (2) reports a mortality of 13.65 per cent; from 1883 to 1907 Winkel (3) reports a mortality of 6.25 per cent; and, in the same period, Davis (4) reports in his first series a mortality of 16.67 per cent and in his second series a mortality of 5.79 per cent.

That mortality has steadily decreased of late years as strictness in keeping the patient free from infection has increased, is strikingly shown in Table II.

TABLE II

	In Labor Membrane Ruptured	In Labor Membrane Intact	No Examination	Before Labor
Routh (5)	35.4%	4.7%	.....	4.3%
Banasz (6)	.....	7.4%	.....	.....
Winkel (3)	.....	6.25%	.....	.....
1883–1907				
Pestalloza (7)	.....	.....	2.03%	.....
Döderlein (9)	.....	.....	3.3%	.....
Zweifel (10)	.....	.....	1.8%	.....

Probably every obstetrician at the present time requires that there be no examination by midwives and none repeatedly even by careful physicians if the classical operation is to be performed. Attempts at dilating the cervix or other attempts at delivery are also regarded by the great majority as contra-indications to the classical. The following table is a summary of the contra-indications to the classical as given by various clinicians, cited under the names of the compilers.

TABLE III

CONTRA-INDICATIONS TO THE CLASSICAL

	After Labor Starts	One Unclean Examination	Repeated Examinations	Membrane Ruptured	Prolonged Labor	Membrane Ruptured; No Examination	Membrane Intact. Frequently Examined
Veit (11)	..	+	..	..	..	..	..
Lornaudie (12)	..	..	+	+	+	..	..
Cholmogoroff (13)	..	..	+	..	..	..	..
Morioton (14)	+	..	..	..	..	..	..
Küstner (15)	..	+	..	+	..	..	..
Kretschmer (16)	..	+	..	..	..	..	..
Rosner (17)	..	+	..	..	..	..	..
Peterson (18)	..	..	..	..	..	+	+
Banasz (6)	+	..	..	..	..	..	..
Bürger (8)	+	..	..	..	..	..	..
Pankow (19)	+	..	..	..	..	..	..
Tweedy (20)	..	..	..	+	..	..	..
Bell (33)	..	..	+	..	..	..	..

From this table it will be noted that of thirteen clinicians, eight will not permit a classical if the case is one in which the membranes are ruptured or there have been repeated vaginal examinations or one unclean examination; four will not

permit it if there has been one unclean examination. This practically limits the classical to those cases that come in before or at the onset of labor, or to those cases which the operator knows have been examined by an attendant who has mastered the technique of making a vaginal examination aseptically. This strict limitation will be necessary until a more correct knowledge of the proper indications for the application of forceps and for other efforts at delivery, such as manual dilatation, has become more widespread. This restriction will always have to be enforced very rigidly in cases which have been attended by midwives. In and around Greensburg the midwives are for the most part of Austrian origin. They were once fairly well trained, but they have degenerated through lack of regulation and control. It would be well worth while to have every midwife report to a state hospital every three years, for one month of renewed training in asepsis. If a midwife, at least in our locality, has examined a case once, the case is usually regarded as infected; in fact, I find that nearly all the cases of puerperal sepsis have been attended by midwives. Staphylococci and occasionally streptococci have been demonstrated *in utero* in many cases which have been cared for by midwives, while those cared for by attendants who understand the importance of rigid asepsis and few examinations are usually free. The cases attended by midwives have a larger percentage of morbidity (Rotunda standard) than those attended by careful physicians. From these facts I conclude that the classical cannot be undertaken with justness to the mother if (1) she has been examined once in an unclean manner; (2) if she has been repeatedly examined by any one; (3) if prolonged attempts at delivery have been made.

This does not take into consideration the case which is actually infected, for such cases of course are excluded. Most of the cases coming to section are emergency cases which have been subjected to several examinations and various efforts at delivery. These cases constitute the majority at the present time, as they did in the past when the mortality was 35 per cent, though occasionally a patient who has had trouble is warned to enter the clinic early enough to protect her from interference. Every year cases come to us, either infected or suspected of infection, in which a mortality of at least 16 per cent may be expected from the classical.

How to get a larger percentage of living children and mothers in these three classes of cases is a problem. Pubiotomy offers a partial solution in multipara, but in primipara (21 to 30) it is unsafe, and in either category its use is limited to pelves whose conjugate is more than 7.5 cm. Pure extraperitoneal cæsarean at first offered, apparently, the solution of the problem in the suspected case and the operation resulted in a decrease in the frequency of peritonitis, but the extensive disturbance of the cellular tissue caused cellulitiden almost as serious (31 and 32). About contemporary with the development of extraperitoneal cæsarean section, the transperitoneal operation was devised, and this operation seems to have the advantage of decreasing the frequency and severity of cellulitis. It appears to have lost favor in Continental clinics, but has been approved by several British and American obstetricians. The technique I use is the same as that used by Tweedy (20):

1. Pfannenstiel incision of skin and fascia.
2. Longitudinal separation of recti.
3. Transverse incision of parietal peritoneum and of that covering the uterus at the uterovesical fold, which is stripped back to the point where it becomes closely adherent to the uterus. The margins of the parietal and uterine peritoneum are then sutured together with a close, interrupted catgut suture. The result is that the peritoneal cavity is closed off, while a large area of the body of the uterus is exposed, but the cellular tissue between the layers of the broad ligament is not disturbed.
4. The uterus is opened longitudinally in its lower segment and the infant extracted. The placenta separates, usually spontaneously. If a rent is made in the peritoneal reflection, it is sutured at once. The uterus is packed with gauze and the end passed into the vagina. The incision in the lower segment is closed with interrupted catgut sutures. The abdominal incision is closed in the usual manner with drainage, if there is a possibility of suppuration.

Case 1. A. P., age 18, I-para. Previous medical history: Husband contracted syphilis two years previous; otherwise negative. Course of present labor: Labor started July 10, 1913; patient attended by midwife. Uterine contractions were strong and regular. At the end of twenty-four hours there had been no progress. The midwife made repeated examinations without aseptic precautions, introducing lard and olive oil into vagina. At the end of thirty-six hours, Dr. Everhart was called, and his examinations established the following facts: Temperature and pulse, normal. Abdominal examination showed uterine contractions very vigorous and regular. The fœtus was in the second position, head not engaged. Fœtal heart sounds were good. Vaginal examination showed the cervix dilated three-quarters, membranes ruptured. Forceps were applied tentatively without effect. The patient was sent to the hospital. Examination on admission to the hospital; rhachitic dwarf; height, four feet, 10 inches; scoliosis; rhachitic rosary; bowed legs; bones large and irregular.

Patient very strong, with great endurance. Uterus irritable; contractions every four minutes, duration, 45 seconds. The fœtus was in the second position, back in front and to the right, brow presenting. Fœtal heart sounds, 120. Mensuration: I. S., 29; I. Cr., 29; ext. cong., 17; cong. diag., 9.5; C. V., 8.5. The cervix was three-quarters dilated, brow presenting, not engaged. The membranes were ruptured. Temperature 99°; pulse 100.

In the hope that the brow might engage, and in view of the woman's good condition and strong physique, we decided to let her have a still further test of labor. The patient was put in the Walcher position during pains. Nine hours later there had been no advance, the head being still movable above the brim, and the mother's condition commenced to become serious, the temperature and pulse rising, while the uterine contractions began to assume continuous character and an increased violence. Fœtal heart sounds, 116. Three modes of delivery were possible:

1. Perforation of the living child. This was not considered.

2. Pubiotomy; contra-indicated because the woman was a primipara and was not fully dilated (21).

3. Cæsarean section. The classical was contra-indicated because of the high mortality following cases which have been frequently examined and with membranes which have been ruptured for some time. The transperitoneal was selected and performed forty-six hours after onset of labor.

Course of operation: The child was delivered in white asphyxia. There was very slight hæmorrhage. The peritoneal reflexion was intact. The wound was closed without drainage, and the patient left the operating room in very good condition and without shock.

Post-operative course: The gauze packing was removed from the uterus at the end of forty-eight hours. Convalescence was good. Locally the skin incision broke down in two places. These lesions showed little or no tendency to granulate, a condition attributed to the syphilitic condition present. At the end of three weeks the lesions had apparently united by second intention, but soon broke down again. The patient was readmitted on this account five weeks after the operation, at which time the granulating areas were curetted and sutured, but they broke down a week later. Mercury and the iodides were used in the hope of favoring healthy granulation.

The child revived, weighed six pounds fourteen ounces, and showed fair development. In the beginning of the fourth week signs of syphilis appeared: first with snuffles, coryza, and pemphigus of the feet, later with rapid emaciation (loss in one week, two pounds) resulting in death.

Case 2. M. B., age 23, Italian, I-para. Previous medical history: negative. Course of present labor: Labor commenced November 14, 1913, with midwife in attendance. The uterine contractions were strong and regular. A physician was called at the end of sixteen hours. Abdominal examination showed second vertex, uterine contraction severe, fœtal heart sounds good. Vaginal examination: The cervix was hanging like a curtain. There was dilatation of three fingers, the membranes had ruptured, and the pulse and temperature were normal. Twenty-seven hours after onset of labor there was no advance, the cervix was the same, the temperature was 99.2°, and pulse 100. Patient sent to hospital.

Condition on admission: Temperature 100°, pulse 112. The patient was a well-built, muscular woman, with rhachitic rosary. The uterine contractions occurred almost without interval; the uterus was tender, the left round ligament tense and projecting; Bandl's ring was three-fingers' breadth above the symphysis. Fœtal heart sounds, 160. Vaginal examination: Vulva, venereal warts. The vagina was dry, the cervix hanging like a curtain, one-half dilated, the head engaged. Mensuration: Interspinous, 29 cm., intercristol, 30 cm.; ext. conj. 19; true conj. 7.5 to 8 cm. Thirty-one hours after the onset of labor fœtal heart sounds above 160. Transperitoneal cæsarean section was decided upon as the operation to be performed.

Course of operation: The operation was complicated by distended bladder and by a loop of intestines that lay in front of the uterus. The infant was extracted. There was a small rent in the peritoneal reflection which was sutured at once. The placenta was expelled spontaneously. There was no hæmorrhage. The uterus was packed with iodoform gauze and the end projected into the vagina. The patient left the operating room in good condition, pulse 100. The infant was living.

Post-operative course: First twenty-four hours, good, gauze removed; second twenty-four hours, post-operative ileus, abdomen distended; third twenty-four hours, flatus expelled, fæces passed, abdomen less distended, lochia purulent; fourth twenty-four hours, ileus ceased, abdomen flat, gonococci and staphylococci found by Dr. Hill in specimen of lochia taken from uterus. The abdomen was not distended nor tender. Temperature in the morning 99.3°, pulse 120; temperature in the afternoon 102°, pulse 128.

For the next eleven days the patient ran a septic course. Throughout this period there was a profuse purulent lochia while the uterus did not involute and there was no secretion of milk. Signs of peritonitis did not develop; the abdomen remained flat without pain, tenderness or rigidity, showing that the general peritoneal cavity escaped infection. On the fourteenth day the temperature and pulse dropped to normal and remained normal and the lochia gradually became less purulent until on the eighteenth day it was sanguinous. At this time the uterus began to involute steadily. The wound united by first intention, an area of an inch in extent between the two central sutures excepted. Stitch abscesses occurred in these two sutures but healed by granulation within two weeks.

The infant weighed at birth six and three-quarters pounds. It developed an ophthalmia but recovered.

The mother and child were discharged on the thirty-fourth day.

Abdominal examination: Cervix closed, well involuted; uterus a little larger than normal five weeks after labor—size of an orange—freely movable, in normal position, and was not tender. The infant weighed eight pounds when five weeks old.

The patient returned for examination forty-eight days after operation. The uterus had still further involuted and approached nearly the normal. The infant was in good condition. Six months after operation, at final examination, the uterus was completely involuted, freely movable, and normal in position. The cervix was not fixed and there was no evidence of any infiltration between it and the abdominal scar.

The transperitoneal method has been used by Sellheim, Tweedy, Hirst, Baumgarten, Frank, and Freeland. I have collected detailed histories of twenty-eight cases reported by some of these men, to which I have added four cases of Freeland reported to me verbally and the two from my own experience, and codified as follows:

Total number of cases	28
Membranes ruptured	19
Examined vaginally	26
Repeatedly examined and suppurated	9
Mothers lived	26
Infants lived	26
Union by first intention	8
Suppurated	15
Drained	11
Hours of Labor:	
0 to 10 hours	7 cases
11 to 19 hours	4 cases
20 to 29 hours	7 cases
30 to 120 hours	5 cases
Unknown	5 cases
Temperatures:	
97°	6 cases
101°	7 cases
102°	3 cases

Balance not known.

BIBLIOGRAPHY

1. NICHOLSON, W. R. Surg., Gynec. & Obst., 1914, xviii, 244.
2. ROUTH. Zentralbl. f. Gynäk., 1912, No. 6, 183.
3. WINKEL. Zentralbl. f. Gynäk., 1910, No. 45, 1446.
4. DAVIS. Zentralbl. f. Gynäk., 1913, No. 18, 676.
5. ROUTH. Zentralbl. f. Gynäk., 1910, No. 45, 1446.
6. BANASZ. Zentralbl. f. Gynäk., 1907, No. 46, 1455.
7. PESTALLOZA. Zentralbl. f. Gynäk., 1910, No. 45, 1445.
8. BÜRGER. Geburtsleitung bei engem Becken. Wien, 1908, p. 145.
9. DÖDERLEIN. Bürger's Geburtsleitung bei engem Becken. Wien, 1908. p. 145.
10. ZWEIFEL. Bürger's Geburtsleitung bei engem Becken. Wien, 1908, p. 145.
11. VEIT. Zentralbl. f. Gynäk., 1910, No. 12, 419.
12. LORNAUDIE. Zentralbl. f. Gynäk., 1910, No. 28, 970.
13. CHOLMOGOROFF. Zentralbl. f. Gynäk., 1910, No. 16, 531.
14. MORIOTON. Zentralbl. f. Gynäk., 1912, No. 52, 1778.
15. KÜSTNER. Zentralbl. f. Gynäk., 1914, No. 10, 366.
16. KRETSCHMER. Zentralbl. f. Gynäk., 1907, No. 46, 1455.
17. ROSNER. Zentralbl. f. Gynäk., 1913, No. 8, 294.
18. PETERSON. Zentralbl. f. Gynäk., 1912, No. 28, 940.
19. PANKOW. Zentralbl. f. Gynäk., 1910, No. 45, 1449.
20. TWEEDY, E. H. Reports, Rotunda Hospital, Dublin, 1910.
21. DÖDERLEIN. Zentralbl. f. Gynäk., 1910, No. 45, 1447.
22. PANKOW. Zentralbl. f. Gynäk., 1910, No. 45, 1449.
23. HENKEL. Zentralbl. f. Gynäk., 1910, No. 30, 1031.
24. KUBINIYI. Zentralbl. f. Gynäk., 1910, No. 29, 1003.
25. SELIGMAN. Zentralbl. f. Gynäk., 1910, No. 8, 289.
26. EVERSMAN. Zentralbl. f. Gynäk., 1910, No. 8, 288.
27. RUDER. Zentralbl. f. Gynäk., 1913, No. 4, 170.
28. LACKIE. Zentralbl. f. Gynäk., 1913, No. 19, 694.
29. KRIWSKI. Monatschr. f. Geburtsh. u. Gynäk., xxxvii, No. 4.
30. WEIBEL. Zentralbl. f. Gynäk., 1913, No. 41, 1516.
31. BUMM. Zentralbl. f. Gynäk., 1910, No. 48, 1577.
32. SCHEFFEK. Zentralbl. f. Gynäk., 1913, No. 27, 1012.
33. BELL. Zentralbl. f. Gynäk., 1913, No. 18, 677.

OPERATIVE TREATMENT OF FRACTURES[1]

BY WILLIAM R. JACKSON, M.D., F.A.C.S., MOBILE, ALABAMA
Professor of Surgery, University of Alabama

WHEN fractured ends of bones cannot be adjusted or coapted snugly by traction, counter-traction, and manipulation, or when coaptation cannot be maintained by splints and plaster of Paris, then it becomes necessary and proper, yea, mandatory, to resort to measures and procedures that will coapt and maintain adjustment of the fragments. This rule applies to any fractured bone. Delayed or viscous union caused by displaced fragments and interposition of soft tissues require operation also. Most simple fractures can be adjusted without open operation, while others demand operative intervention. It has recently been observed that when any fracture is dealt with by open operation, there is always *delay in union, delay of callus formation;* hence the time for union may be four to eight *months* instead of four to eight *weeks*.

The cause of delayed union in operative cases of fracture is disturbance of the circulation in the ends of the fragments caused by handling and the separation of soft tissues, the periosteum, muscles, etc., from the bone, and injury to the medulla. Callus production is greatest from the medulla, then from cancellous, then from compact layer.

It has long been taught by Ollier that the periosteum is a bone (callus) producer, that the inner layer of the periosteum (cambium) was the most powerful osteogenetic agent in the union of bone, but since the clear demonstrations of Macewen that the periosteum takes no part in bone production, and that only *bone* produces *bone*, most authorities concede that the periosteum is only a limiting membrane of bone. Macewen showed that transplants of periosteum *alone* never resulted in production of bone, while bone *without* periosteum resulted in the reproduction of bone-cells and the growth of the

[1] Read before the Southern Surgical and Gynecological Association, Asheville, North Carolina, December 15, 1914.

transplant. J. B. Murphy claims that bone-transplants will reproduce bone with or without periosteal covering, provided that the transplant comes in contact with fresh bone-cells at *one* or *both* ends of the bone. Murphy contends that new bone-cells (osteoblasts) form from either end of the sectioned bone, and circulate through the haversian canals of the transplant, and while there they receive nourishment and multiply rapidly causing absorption of the old bone-cells, the transplant acting only as a scaffold or osteo-conductor and is, therefore, not osteogenetic.

The operative measures most commonly used in the treatment of fractures today consist in the use of plates and screws, nails and metal bands, staples and wires, detachable drills and interosseous or intramedullary transplants of autogenous bone. Many cases require only operative coaptation of the displaced fragments plus plaster fixation. It becomes necessary to intervene by open incision in the following fractures: Fracture of neck, trochanter, and upper middle thirds of the femur; fracture of the patella; fracture of both bones of the leg; not always, but frequently, fractures of the clavicle; fractures of the olecranon process; Pott's fracture; and any fracture where coaptation cannot be effected and maintained.

To obtain the best results in the treatment of fractures, repeated examinations by X-ray should be made before, during, and after application of fixation dressings. Most frequently, in simple fractures, perfect coaptation under X-ray will not remain after splints are applied, the amount of displacement depending upon the distance from the bone to the splint on the surface of the limb. Overriding, angulation, rotation, and lateral displacements will occur in 85 per cent of all cases; hence the open or operative treatment is gaining ground with our best surgeons. While delayed union, non-union (in some cases), and occasionally infection may mar some of our cases, the good results in the great majority of them encourage us to continue to do better mechanical and aseptic work.

TECHNIQUE USED IN APPLYING LANE'S PLATES

1. Thorough iodine disinfection of the whole field.
2. Securing towels above and below line of planned incision by clips.
3. Securing towels to each edge of skin incision by Moynihan's towel clips.
4. Have all screws which are to be used, securely held by forceps, likewise the plate itself held by proper forceps.
5. Do not put gloved hands or fingers into the wound. Coaptation is effected by traction forceps and elevators.
6. Do not touch that part of any instrument which comes in contact with the tissues.
7. Do not handle or touch sponges with the hand (gloved), but always use sponges held with forceps.
8. Do not *suture* the skin but close preferably by metal skin clips. Always denude the ends of bone-fragments.
9. Put on plaster cast and do not make extension after plates are placed.
10. Remove skin clips on tenth to fourteenth day and continue cast till solid union or bone occurs.

CONCLUSIONS

1. When plates are used, they should be placed on fleshy side of limb and not subcutaneously.
2. Screws should fit snugly and hold the plate tightly to the bone. This should be done if a longer plate and more screws are made necessary, as any motion prevents union.
3. If it ever became necessary to remove a plate, it was due to the fact that the plate was not properly placed or the technique was faulty.
4. It is not always necessary to remove a plate when infection has occurred.
5. That plating of fractures does not always mean bony union, as this fails to occur in some cases, even after bone-transplants are used; these are the "non-union" cases. If a little callus forms at the end of ten months, union may be confidently expected. If fifteen months fail to show any callus formation, then we decide that it is a "non-union" case.
6. Compound fractures should not be plated until converted into simple ones.
7. Shortening of the limb always follows plating in chronic or "ancient" fractures because of the necessary resection of the ends of the fragments for coaptation.

The following cases will show some of the results of operative treatment of fractures:

CASE 1. Male, colored, age 20. Fracture of the upper third of femur, caused by a fall from a height, striking the thigh with great momentum. The patient was not seen until one week after the accident, being under the care of the family physician during the preceding seven days.

Traction and counter-traction (Buck's extension) failed to coapt the fragments. The patient was anæsthetized, and traction and manipulation failed to give satisfaction. Fourteen days after the fracture occurred, a Lane's plate was placed and the limb put into a plaster of Paris cast; union *per primam* in ten days, and the sutures were removed. The plaster cast was worn two months, at the end of which time slight motion was perceptible, and at

the end of the fourth month the patient was walking without crutches.

CASE 2. Female, colored, age 10. Fracture of middle third of femur with marked lateral and overlapping displacement which did not yield to Buck's extension treatment. A Lane's plate was placed ten days after the fracture. In fourteen days the sutures were removed, and union was perfect. The cast was kept on two months, when the patient was permitted to walk without cast. Union was firm in three months.

CASE 3. Male, white, age 20. Fracture of lower third of femur which occurred while wrestling. Previous to fracture, the patient had disease of lower end of femur with discharging sinuses for past fourteen years, beginning when the boy was six years of age. The fracture occurred at this weak point of bone. Buck's extension, etc., failed to effect a cure. At the end of two months a Lane's plate was placed opposite the diseased side in the healthy tissue. The wound healed in ten days and the sutures were removed, but sinuses continued to discharge from the diseased area. A plaster cast was kept on four months, when the plate gave rise to irritation and was removed. The removal showed perfect bony union at point of fracture. Necrotic area of bone and sinuses were curetted and drained and ten months later the patient was entirely well.

CASE 4. Female, white, age 14. Fracture of middle third of femur resulting from being violently thrown against timbers by a hurricane. Fracture of the skull also present.

Treatment of skull fracture, trephine, etc., was done by another surgeon, the fracture of the leg being almost entirely neglected. Two months after the fracture of the femur there was *no union;* overriding and angular displacement and four inches shortening were present. At this time the patient's general health permitted of operative treatment of the fracture. A Lane's plate was placed on the outer side of the bone, and a cast applied. Union by first intention, and sutures removed in ten days, but free mobility at the point of fracture. Cast kept on and renewed several times, but at the end of four months there was no union, and a tendency to angulation was present. Six months passed and motion was still marked at the point of fracture. At the end of eight months one of the screws caused necrosis of the overlying skin and necessitated removal of the plate, and yet there was no solid union. A new cast was put on and patient put out-of-doors on crutches, and now, fourteen months since the fracture, the patient is walking without crutches. The knee was anchylotic at the time of open operation and continued so until permanent union, when it was forcibly flexed under general anæsthesia, and yet there is only limited motion in the knee-joint.

CASE 5. Female, white, age 7. Fracture in middle third of femur, resulting from a fall from a high fence. Lateral and overlapping displacement, and angulation and shortening. One month after the fracture when extension treatment failed, a Lane's plate was applied. Twelve days later the sutures were removed; union by first intention. Cast continued two months, no union after four months. Plate caused suppuration at the end of fifth month. The plate was removed, but no solid union; plenty of soft callus and great mobility at point of fracture. Cast renewed and patient put to walking with crutches. Ten months since fracture, and marked mobility still present in the fracture line.

CASE 6. Male, colored, age 37. Fracture of upper third of femur, also right humerus and both tibia and fibula of left leg. An injury received in a sawmill was the cause of the multiple fracture. Coaptation of other fractures was satisfactory, but the femur would not remain coapted. A Lane's plate was placed ten days after fracture. Michel clips were used in closing the skin and a cast applied. Primary union on tenth day, when the clips were removed. The cast was still worn. Two months after operation union was apparently firm. The patient was allowed to be up on crutches, and in four months walked without any aid.

CASE 7. Male, white, age 48. Fracture of lower third of radius and ulna, shortening and angulation. The patient was treated in the country. Three months after fracture there was no union. Lane's plates were placed on the radius and ulna. Clips to skin, and a plaster cast was applied. Twelve days after operation, clips were removed: union by first intention. A new cast was applied and the patient is still under observation. It is three months now since operation and there is marked motion at the point of fracture.

CASE 8. Male, white, age 58. Fracture lower third of humerus. This patient was treated primarily by another surgeon, first by plaster cast, then by wiring the bone and then by Lane's plate, all of no avail. There was no union nine months after fracture.

A bone-transplant from patient's tibia was inserted firmly into each end of fractured fragment after reaming them out. The limb was put up in a plaster cast. Ten days later the sutures were removed and suppuration in the lower angle of wound was present. Drainage and plaster fixation were kept up four months and the X-ray failed to show any osteogenesis in the transplant; mobility and infection persisted. At end of six months infiltration of pus from the transplant threatened the life of the limb, when the transplant was removed, showing not the least indication of new-bone production; on the contrary absorption (osteoclasis) was noticeable. Result of the fracture was fibrous union (pseudo-arthrosis) with fair motion and anchylosis at elbow-joint.

CASE 9. Male, white, age 19. Fracture of both tibia and fibula, middle third, resulting from automobile wheel passing over the limb, making it a compound fracture. Adjustment under anæsthesia was made and splints (felt) applied. The X-ray showed displacement laterally and angulation and shortening. Open operation six weeks later enabled replacement of fractured ends, which were serrated so that coaptation remained without application of Lane's plates or other mechanical device. Suture and plaster cast. In ten days there was primary union of soft tissues, but mobility at point of fracture persisted eight months, when solid, firm union resulted.

DESCRIPTION OF AN ELECTRIC MOTOR FOR USE IN BONE WORK

By R. E. FARR, M.D., Minneapolis, Minnesota

I DESIRE to call the attention of the surgical profession to an electric motor which I have used with great satisfaction during the past eighteen months, in bone work. It possesses some features which, I believe, are worthy of note.

The most important of these is the ease with which it is sterilized. The manufacturers guarantee that it will stand a temperature of 275° F. of dry heat, and we have sterilized it repeatedly in the autoclave with the sheets, gowns, and other materials, simply wrapping it in a flannel blanket. Its weight is six and one-half pounds, which is, it seems to me, just about right. Lighter motors cannot be held steadily in the hands, and heavier ones are not easily manipulated. This motor may be used on either the direct or alternating current, and it has a speed of fifteen hundred revolutions per minute, with an abundance of power. The chuck is universal, and therefore all drills, saws, and other instruments sold in the shops may be used in it.

As this motor is manufactured for the use of the ordinary artisan, it may be purchased at a low cost, retailing at forty-five dollars. A rheostat and foot switch can be attached to the motor at very little additional expense. I have had a small cylinder, illustrated at point "X," made to be used as a handle and to protect the hand from the exposed revolving parts.

"Thor" motor, DA-OOZ. X indicates handle.

I think the sterilizing feature is an important one, as the technique of using cloth protection or a metal case is more or less difficult, and breaks in asepsis are not easily avoided.

GALL-BLADDER INFECTIONS: THEIR TREATMENT FROM A SURGICAL VIEWPOINT[1]

By LOUIS FRANK, M.D., F.A.C.S., Louisville, Kentucky

A COMPREHENSIVE study of the treatment of gall-bladder infections from any standpoint cannot be contemplated in a brief thesis. There has been such a wealth of literature upon the subject during the last few years, including classical monographs by Moynihan, Kehr, and others, that your essayist can make no serious claim to originality. There still remain certain features, however, in connection with the treatment of gall-bladder infections, which may be worthy of discussion and further elucidation. And we think the final verdict is yet to be rendered as to disposition of the gall-bladder itself in cases which come for operation.

It is the generally accepted belief that infections reach the biliary tract through the bile channels as well as through the circulation. It may be added, also, that the infection may travel through the lymphatics, which may serve to explain those cases which occur in conjunction, following, or coincidental with, attacks of appendicitis or intestinal disturbances due to the colon bacillus. "Not infrequently the condition (cholecystitis) is associated with appendicular in-

[1] Read at the meeting of the Mississippi Valley Medical Association, Cincinnati, October 27-29, 1914.

fections of a chronic character, especially those forms of appendicitis in which foreign bodies, usually fæcaliths, are present. Whether or not such appendicular infections are the direct cause of the infections in the gall-bladder has not been determined, but it seems possible inasmuch as bacterial or toxic products are 'picked up' in the derivatives of the portal circulation, carried to the liver, and there destroyed or excreted in a modified form with the bile. When such infected bile is delayed in the gall-bladder, cholecystitis may result." [1]

At this point we would call attention to the work of Mr. Lane, and, although we are by no means prepared to accept his premises in their entirety nor agree with his conclusions *in toto*, we do believe he has opened a wide field—not for speculation, but for profound and deep study and experimentation in its relationship to the subject under discussion. It may be that in the extensive field which has been thus opened for study by his work on gastroptosis a bright nugget will be found in connection with gall-bladder disease. Some of the chronic infections of the gall-bladder without the presence of stone may in great measure be dependent upon coprostasis, or may have their inception in fæcal stasis, to which Mr. Lane has attributed many of the ills of mankind and womankind.

There are two types of cases, to which we would direct especial attention at this time, lying at the two extremes of gall-bladder infection. The first type, which has been known as cholecystitis without stone formation, is met at the beginning of the road. The second, lying at the end of the road, so to speak, is chronic obstruction of the common duct from calculus.

We hear a great deal about the first type, and the frequently reiterated statements as to the satisfactory outcome of gall-bladder surgery would lead us to believe that cholecystitis without calculi is most amenable to treatment; in fact, so general has become the belief that gall-bladder surgery is extremely satisfactory that those who are aware of the real state of affairs, at times find much trouble in outlining the true facts to those who come for operation.

Our own observation has been that cases without stones are among the most difficult to relieve permanently, and we are of the opinion that until within the last year or two our treatment of this type has probably been at fault. We have time and again seen patients subjected to cholecystostomy with drainage of short or long duration, who, after a few weeks or months of relief, would return with precisely similar symptoms as before the operation. Either we or some of our friends have been in error as to the diagnosis, or simple drainage is not the proper procedure in the majority of such cases. Possibly we have erred in our diagnosis, but this we cannot believe has been the rule, as, since subjecting patients to more radical procedures, a greater measure of success has attended our treatment.

We doubt not that the term chronic cholecystitis has been and will continue to be used as an explanation to cover errors in diagnosis, and that behind it will hide some who fear to tell their patients the true state of affairs. There are others who have deluded themselves and will doubtless continue to do so with the belief that this is the actual pathology with which they are dealing. Probably much of this has come from the knowledge that calculi are the end-results of the infection, with the result that we are ceasing in our attempts to diagnose gall-stones and satisfying our consciences with the diagnosis of gall-bladder infection.

A successful culture of bacteria from bile in these so-called chronic cases is not in our opinion sufficient to verify the diagnosis, as our observation has been that in chronic cholecystitis there are definite changes in the gall-bladder walls; whereas the bile itself may or may not (and often does not) contain micro-organisms. The changes in the gall-bladder walls present the same characteristics as inflammatory changes do elsewhere in mucous membranes, and if the gall-bladder is subjected to drainage, pure and simple, an ultimate cure does not result. It is in this type, in which may be included the so-called "strawberry gall-bladder" of Mayo and Moynihan, that cholecystectomy is necessary to secure permanent and complete relief; and this is one of the points to which I would direct particular attention. If prolonged drainage of the choledochous tract is necessary, then after removal of the gall-bladder it is an easy matter to suture a tube in the remains of the cystic duct or into the common duct, and secure drainage for such length of time as may be desired.

In cases of acute cholecystitis, by which is meant an acute infection accompanied by pus formation frequently invading the gall-bladder wall and communicating with the peritoneal cavity, the gall-bladder itself being more or less gangrenous in certain areas particularly about the fundus, the entire viscus being isolated from the general peritoneal cavity by omental adhesions—we do not advise nor do we practice removal of the gall-bladder. We are convinced

[1] W. J. Mayo.

that in this type complete separation of the adhesions is undesirable, and are of the opinion that the best results are obtained by carefully separating the omental wall from only such an area as will permit access to the gall-bladder for the purpose of drainage. We cannot by any technique protect the general cavity as well as does Nature with the omentum or loops of intestine by which she provides a barrier to prevent extension of bacteria, and our aim should be to interfere with this barrier as little as possible. Short incisions through the abdominal wall should be the rule in such cases, and it is unimportant whether or not calculi may be present in the gall-bladder. The primary object is to afford drainage and at the same time to prevent further spread of bacteria and their products, which can best be done in the manner described. If calculi are present we can perform a two-stage operation, but we are convinced this is not the type of case in which to practice total removal of the viscus.

Cholecystectomy is directly in the forefront at the present time, and its exact status has yet to be determined. Just what may be the preponderance of opinion, and what may become the final practice as to disposition of the gall-bladder, I would fear to say. With us it has seemed that it is not so much a question of which gall-bladder to remove, as which one not to remove. The negative side of this question is the one which requires the exercise of greater judgment.

Before leaving the subject of cholecystectomy we would express the further opinion that in all cases where calculi have for any considerable time been resident in the cystic duct, the duct and gall-bladder should be removed.

According to the views of W. J. Mayo,[1] while cholecystotomy may be an efficient procedure in gall-stone disease when the gall-bladder is otherwise normal and the ducts are free, in cholecystitis the method is not satisfactory. A gall-bladder which can "keep up continuous trouble" from infection alone without the mechanical irritation of gall-stones will probably not be cured by simple drainage, and cholecystectomy will be the procedure to follow. As a matter of fact, cholecystectomy is now largely indicated in gall-stone disease, and it may be said that practically all cases of cholecystitis and the large majority (probably 80 per cent) of cases of gall-stone disease should be treated by cholecystectomy rather than cholecystostomy.

The other type of cases to which we desire to call attention is that in which calculi are present in the common duct, producing more or less continuous complete obstruction. If the obstruction is acute, there is practically but one opinion as to the surgical course to be pursued; but if the obstruction is chronic, if cholangeitis has supervened, if the infection has extended to the bile ducts of the liver, we think the procedure to be followed is open to much discussion.

Crile has again recently called attention to the high death rate in these cases, and all who have had much experience in this class of work know that the mortality is out of all proportion to the surgery of other parts of the body and in almost any other pathology. So far as can be ascertained it is from 10 to 25 per cent, and Kehr even at one time placed it as high as 90 per cent. The mortality has been markedly lowered through anoci-association and the administration of nitrous oxide gas. Crile expresses the belief that many of these patients die as the result of trauma to the nerve supply of the liver, and to further disturbance of its function. He makes the further point that, with the liver damaged as is certain to occur in these cases, the administration of a lipoid-solvent anæsthetic is absolutely contra-indicated, and in this we heartily agree.

We would offer as a further explanation of the fatality in these cases, aside from that due to sepsis, the sudden release of the intrahepatic pressure due to rapid emptying of the overdistended biliary tract. We have here a condition quite analagous to that in the kidneys of old prostatics. The sudden release or alteration in intrahepatic pressure permits a tremendous influx of blood, arterial, and portal, with an accompanying stress of such an extent upon liver-cells already damaged that their metabolic function become impossible. Poisonous material in thus retained and absorbed into the blood, and as a result death ensues.

Our own operative work in recent years, particularly during the last two and one-half years since we have familiarized ourselves with the anoci-association method, has been performed under gas-oxygen anæsthesia and complete blocking, contenting ourselves with preliminary drainage of the gall-bladder, and dividing the operation into two stages. After the gall-bladder has been permitted to drain for some time, and the patient's temperature has receded to normal and the jaundice has subsided, we then do a secondary operation, removing the obstruction from the duct. We are sure that under this plan the mortality has been materially reduced, and we would offer this suggestion to those who have not yet tried the method.

[1] Mayo, W. J., Am. J. Med. Sc., 1914, April, 472.

PRIMARY RESULTS OF RADIUM TREATMENT IN UTERINE AND RECTAL CANCERS

With a Report of Twenty-three Cases

By HENRY SCHMITZ, A.M., M.D., Chicago

ON April 1, 1914, I obtained fifty milligrams of radium element in the form of radium barium sulphate, 60 per cent pure. The radium is inclosed in equal parts in two glass tubes 13.8 by 2.9 mm. and 13.15 by 3 mm. respectively and these tubes are placed into two Dominici silver capsules. The walls of the silver tubes are 0.5 mm. thick. Besides these two silver tubes I have a larger one, the walls of which are also 0.5 mm. thick, and in which I can place both glass capsules, if I wish to use the entire amount of radium element in a given case.

Upon the receipt of radium element, I began to treat uterine cancers immediately. I must thank Professor A. J. Ochsner for placing at my disposal the greater part of the clinical material reported here. The technique used consisted at first in the application of 50 mg. of radium element for ten to twelve and later for forty to sixty hours, repeated at first every four days, and later every eight to ten days. The α-rays and β-rays were excluded by lead or brass filters, over which a rubber cot was drawn to exclude the secondary rays. The applications were continued until a marked improvement occurred in the local, as well as the constitutional, condition of the patient. Most of the patients had inoperable uterine cancers or recurrent cancers after operations.

The radium treatment of most of the cases of inoperable primary cancer of the uterus was preceded by a cauterization of the uterus with the actual cautery. The radium was applied as soon as the condition of the patient permitted. If, after applying radium, the uterus became freely movable and the infiltrations in the parametrii disappeared, an abdominal panhysterectomy was performed. In some of the cases tissues were removed for microscopic examination; in others this was not done. In all the cases operated on after radium treatment, the removed tissues were carefully examined by the microscope. In this connection I wish to state that I treated with radium every case of uterine, vaginal, or rectal cancer referred to me, regardless of the local or constitutional conditions present. This I did to study the local action of radium under all conditions. In all of the cases the radium treatment was combined with massive X-ray applications. The rays were applied through the anterior abdominal wall according to the principles of the Krönig-Gauss massive filter method. They were given in séances of six daily treatments with an intermission of two weeks. About 50 to 60 x of rays were applied daily. Whether the X-ray treatment favorably influences the metastatic cancers and distantly located cancer-cell nests I cannot state, but I am inclined to believe that the X-rays are more useful in conjunction with radium treatment than if used alone. As a matter of fact I have never seen a uterine cancer that was favorably influenced by the application of massive X-rays unless some other therapeutic measures were used in combination with the same.

Chemotherapy has not been employed in the treatment of my cases. However, I am firmly convinced of the correctness of its principle and will in the future combine radium treatment with chemotherapy.

It is needless to state that every operable case of uterine cancer was immediately subjected to a radical operation and afterwards to radium treatment. I coincide with the opinions of Foveau de Courmelles, Duval, Wickham and Degrais who state that radium and X-rays should not be antagonistic to surgery but should become its adjuncts. In fact, they insist on a new branch of surgery, a radium surgery, where one agent supports the other as a given case might indicate. Every uterine cancer subjected to an operation was treated afterwards with radium and X-rays in order to destroy all the cancer-cell remnants which might have been left behind. These latter cases are also included in this report though the time is really too short to permit of any practical deductions.

The side actions of radium have been marked in some cases; in others they were entirely absent. The symptoms most commonly complained of were a burning sensation in the bladder or rectum, at times increasing to an actual tenesmus, vomiting and nausea, diarrhœa, loss of appetite, severe nervousness, loss of weight, and hyperpyrexia. The loss in weight seemed to be very marked in all the cases so that

the patients apparently failed under treatment. In Case 7, reported below, an endocarditis existed when the patient was admitted. This grew rapidly worse under radium treatment, so that the patient succumbed almost suddenly. The suggestion has been made that the endocarditis might have been a symptom of a general cancer disease, a "carcinomatosis." In most of the cases a reaction occurred within two, or at the latest within three, weeks. It appeared as if all the side actions had subsided, at least the patients ceased complaining, the appetite returned, and with it a gain in weight, strength, and general health. The immediate beneficial effects of radium applications consisted in a disappearance of the characteristic putrid odor, the pyorrhœa changed to a slight thin watery discharge and the hæmorrhages were wholly arrested. These facts explain the remarkable influence which radium treatment exerts on the disposition of the patients. They change from downhearted, listless, moribund beings to healthy looking, life-enjoying people, full of the rosiest hopes for a bright future.

In the following paragraph I shall enumerate the cases of inoperable primary cancers of the cervix. The cases of cauliflower cancer were subjected to an excochleation with cauterization. As soon as the patients recovered from this operation they were treated with radium. In two cases, in which the cancer was of the ulcerative form, radium treatment was begun immediately without excochleation.

Case 1. Mrs. L. W., age 35; married 7 years; 0-para; Augustana Hospital, No. 30,469, admitted March 19, 1914; referred by Dr. A. J. Ochsner. Clinical diagnosis: Carcinoma cervicis uteri. Microscopic diagnosis: Carcinoma.

Treatment: March 20, 1914, Cauterization with actual cautery. April 1, 1914, application of calcium carbide. April 3, 1914, 25 mg. radium element in 3 mm. lead filter, into crater of cervix—425 mg. hours. April 7, 1914, cancerous odor had disappeared, discharge lessened; 50 mg. radium element in 2 mm. lead filter were applied—550 mg. hours. April 12, 1914, discharge had stopped entirely. Crater was dry; 50 mg. radium element in 2 mm. lead filter—550 mg. hours. April 16, 1914, 50 mg. radium element in 2 mm. lead filter—575 mg. hours. April 20, 1914, 50 mg. radium element in 2 mm. lead filter—550 mg. hours.

The patient received 2,600 mg. hours radium element. The vagina was covered with healthy looking granulations. The patient felt subjectively much improved. Cough, delirium, pyrexia, and also odor and discharge had disappeared. On April 26, 1914, the uterus was found freely movable, the crater dry. The patient felt subjectively well. On her return June 1, 1914, she was free of all pain, had a scanty, colorless and odorless discharge, had not had any hæmorrhages, although she menstruated for three days. On May 18, 1914, she had gained ten pounds in weight, felt stronger and was much brighter mentally. The uterus was freely movable. An indurating band involved the left adnexa. Fifty milligrams of radium element were inserted in 2 mm. lead filter from 8:30 a.m. June 2, to 7:30 a.m. June 4, 1914; all told 2,350 mg. hours. As the uterus became operable now, i.e., freely movable, an abdominal panhysterectomy was performed by Dr. A. J. Ochsner. The uterus was removed without difficulty. On the left side the patient had a hydrosalpinx. The microscopic examination revealed necrotization of all cancer-cells. Not a single active cancer-cell was found.

Patient received 2,200 mg. hours on June 29, 1914, the radium being inserted directly between the stumps of the broad ligaments. She now feels subjectively well, has no pain, sleeps well and gains constantly in weight and strength. She returned to the hospital on July 31, 1914, complaining of a great deal of vesical tenesmus. Examination was negative except that a firm induration could be palpated around the vaginal stump. The crater seemed to be lined with a white membrane. Another 1,200 mg. hours of radium was given. During the radium treatment the patient received as stated above from 100 to 120 X massive X-rays every three weeks and also on her return to the hospital, June 29th and June 31st. Soon after returning home an unbearable pain was felt in the bladder. The patient had been a morphine user and resumed the use of the drug. She soon became bedridden, mentally cloudy, and developed symptoms of an involvement of the bladder and has since succumbed. This patient never manifested any secondary effects from the radium treatment.

Case 2. Mrs. Th., age 65; married, 1-para; referred by Dr. A. J. Ochsner. Clinical diagnosis: Carcinoma cervicis uteri et vaginæ. Microscopic diagnosis: Squamous cell cancer of the cervix.

Treatment: March 6, 1914, uterine curettage and cauterization of cervix with actual cautery. Microscopic examination of curetted tissues shows a squamous cell cancer. April 3, 1914, examination reveals mass of ulcerations including clitoris, vestibule, and inner surface of labia minora. The patient was given 593 mg. hours with 25 mg. radium element in 2 mm. lead filter introduced into crater of cervix. Microscopic examination of excised piece of tissue shows squamous cell cancer, fibrous tissue, and lymphocytes. April 7, 1914, discharge is very much less, cancerous odor still marked, and 575 mg. hours with 50 mg. radium element in 2 mm. lead filter were applied. April 12, 1914, 625 mg. hours were given. Odor now absent. April 16, 1914, 650 mg. hours were given, making a total of 2,443 mg. hours. On examination the uterus was found freely movable, the vagina healthy looking, the crater dry. Indurations within the parametrii could not be palpated; the cervical crater seemed to be surrounded by a mass of firm tissue. April 24, 1914, uterus and adnexa were removed. Microscopical examination of polypus removed from fundus uteri did not show malignancy. The tissue from cervix showed areas of marked malignancy, others arrest of growth shown by fibrosis surrounding the cancer-cells and a marked flattening of the latter. The cell nuclei show marked karyolysis. May 10, 1914, 1,100 mg. hours were given with 50 mg. radium element in 2 mm. lead filter. May 19, 1914, 700 mg. hours. Patient left hospital and returned July 1, 1914. She had gained ten pounds in weight and felt subjectively entirely well. Bimanual examination was negative. We applied 2400 mg. hours radium element in 1.5 mm. brass filter, the opening in the stump of the vagina having contracted so that it would not permit the use of the larger lead filter. On August 1, 1914, the patient had again gained ten pounds, felt perfectly well, and was doing her own housework. Another 675 mg. hours was given with 25 mg. radium element in 3 mm. lead filter. The vaginal vault was perfectly smooth but covered with a whitish membrane.

This patient also received every twenty-one days a

séance of six sittings of massive X-rays while in the hospital, but not on her returns July 1, 1914, and August 1, 1914. On September 9, 1914, patient reported for examination. She had continued to gain in weight and was free of all distress. Examination was negative. We applied 600 mg. hours of radium element in 3 mm. lead filter. Up to the present, patient has received a total amount of 7,918 mg. hours radium element. Secondary effects of the radium treatment were not observed.

CASE 3. Mrs. E. M., age 52; I-para; widowed; St. Mary's Hospital No. 23,957, admitted March 7, 1914. Clinical diagnosis: Carcinoma portionis vaginalis inoperabile. Microscopic diagnosis: Squamous cell cancer.

Treatment: March 3, 1914, excochleation and cauterization with actual cautery. April 4, 1914, 25 mg. radium element in 2 mm. lead filter inserted into crater of cervix—500 mg. hours. April 8, 1914, 50 mg. radium element in 2 mm. lead filter—575 mg. hours. April 11, 1914, 50 mg. radium element in 2 mm. lead filter—675 mg. hours. April 15, 1914, 50 mg. radium element in 2 mm. lead filter—575 mg. hours. April 19, 1914, 50 mg. radium element in 2 mm. lead filter—550 mg. hours. April 22, 1914, 50 mg. radium element in 2 mm. lead filter—550 mg. hours.

Patient developed a severe almost uncontrollable diarrhœa and rectal tenesmus with rapid loss of weight. The radium and X-ray applications were therefore discontinued until May 9, 1914, when there was inserted 50 mg. radium element in 2 mm. lead filter—1,100 mg. hours. May 14, 1914, 50 mg. radium element in 2 mm. lead filter—650 mg. hours. May 22, 1914, 50 mg. radium element in 2 mm. lead filter—600 mg. hours. May 27, 1914, 50 mg. radium element in 2 mm. lead filter—600 mg. hours. June 4, 1914, 50 mg. radium element in 2 mm. lead filter—600 mg. hours. June 11, 1914, 50 mg. radium element in 2 mm. lead filter—1,400 mg. hours. This made a total of 8,375 mg. hours.

After the first three applications the profuse putrid discharge disappeared. July 1, 1914, the subjective condition of patient was normal except that she felt a fullness in the rectum as if it was markedly constricted. The discharge and odor had ceased; she had no pain or hæmorrhages. The uterus was palpable and freely movable. A hard uniform mass was felt at the base of the left parametrium. The rectum was free of any indurations. An abdominal panhysterectomy was performed July 14, 1914. The recovery of the patient was uneventful. The uterus did not offer any resistance during removal. The microscopic examination did not reveal any cancer-cells or cancerous foci but fibrosis of the uterus and atrophic and hyaline ovaries.

July 20, 1914, 50 mg. radium element in 3 mm. lead filter—1,050 mg. hours. July 22, 1914, 50 mg. radium element in 3 mm. lead filter—950 mg. hours. July 27, 1914, 50 mg. radium element in 3 mm. lead filter—1,100 mg. hours. The total amount of radium element applied was 11,375 mg. hours. August 10, 1914, the patient returned complaining of distention of the abdomen, rectal tenesmus, obstruction in the rectum, loss of appetite, and decrease in weight and strength. Her skin was pale and anæmic. The pain necessitated the use of opiates. October 19, 1914, her physician reported her in a very weakened condition, bedfast, and failing steadily. Apparently there is a bowel involvement as for several weeks she has had a very persistent diarrhœa with tarry stools. She had one vaginal hæmorrhage about one month ago and has a constantly acrid, foul-smelling discharge not tinged with blood.

CASE 4. Mrs. S., age 56; married; I-para; climacteric ten years ago. Present illness: five years ago was taken ill with irregular hæmorrhages, putrid discharges from vagina, and unbearable backache. On examination the entire uterus was found a mass of breaking-down tissues. The case at the time was diagnosed as an inoperable corporeal cancer. June 8, 1910, excochleation and cauterization of uterine cavity was performed. This was followed by repeated applications of a 50 per cent aqueous solution of zinc chlorid. One year afterwards another cauterization was done on account of severe uterine hæmorrhages. August, 1913, patient noticed a recto-uterine fistula, and in November, 1913, a left hypogastric colostomy was performed. This was followed by the application of massive X-rays. During the following three months the patient gradually lost in weight and became cachectic, until April, 1914, when radium treatment was begun.

April 4, 1914, the examination reveals a crater extending into the body of the uterus, profuse hæmorrhages, putrid discharges, arterial bleeding from right side of crater at slightest touch. Clinical diagnosis: Carcinoma corpus uteri inoperabile, with extension into anterior rectal wall and posterior bladder-wall. April 4, 1914, 25 mg. radium element in 3 mm. lead filter—500 mg. hours. April 8, 1914, 25 mg. radium element in 3 mm. lead filter—500 mg. hours. April 11, 1914, 50 mg. radium element in 3 mm. lead filter—500 mg. hours.

The discharge is very much lessened, the odor has almost entirely disappeared, and bleeding has ceased. April 15, 1914, 50 mg. radium element in 3 mm. lead filter—525 mg. hours. April 19, 1914, 50 mg. radium element in 3 mm. lead filter—600 mg. hours. April 22, 1914, 50 mg. radium element in 3 mm. lead filter—562 mg. hours. April 28, 1914, 50 mg. radium element in 3 mm. lead filter—525 mg. hours. May 3, 1914, 50 mg. radium element in 3 mm. lead filter—500 mg. hours. May 7, 1914, 50 mg. radium element in 3 mm. lead filter—450 mg. hours. May 11, 1914, 50 mg. radium element in 3 mm. lead filter—500 mg. hours. May 16, 1914, 50 mg. radium elements in 3 mm. lead filter—700 mg. hours. May 19, 1914, 50 mg. radium element in 3 mm. lead filter—450 mg. hours. May 27, 1914, 50 mg. radium element in 3 mm. lead filter—575 mg. hours. June 4, 1914, 50 mg. radium element in 3 mm. lead filter—575 mg. hours. June 17, 1914, 50 mg. radium element in 3 mm. lead filter—850 mg. hours.

At first the patient lost rapidly in weight and strength, but very soon regained both. June 10, 1914, the patient felt subjectively perfectly well, had gained continuously in weight and commenced to perform all her own household duties. Two weeks prior to October 15, 1914, the patient began to lose all she gained under the radium treatment. The uterus has practically sloughed away, the mass in the rectum is the size of an orange and a vesico-vaginal fistula has formed. She is rapidly losing in weight and beginning to show a cachexia. Pain is constant, requiring opiates for relief. The total amount of mg. hours of radium element used in this patient was 8,312. X-ray applications were not given.

CASE 5. Mrs. J. McC., age 47; married; I-para; St. Mary's Hospital No. 24,096, admitted March 17, 1914. Diagnosis: Cauliflower cancer of cervix uteri, involving parametrii and anterior rectal wall. Microscopic diagnosis: Squamous cell cancer.

Treatment: March 19, 1914, excochleation and cauterization with actual cautery. Patient received up to date about 800 x massive X-rays. April 14, 1914, 50 mg. radium element in 2 mm. lead filter — 600 mg. hours. April 18, 1914, 50 mg. radium element in 2 mm. lead filter — 550 mg. hours. April 23, 1914, 50 mg. radium element in 3 mm. lead filter — 600 mg. hours. Patient now feels subjectively perfectly well and in spite of continued requests neglects to be further treated.

June 17, 1914, patient returned complaining of a profuse

watery, odorless discharge from the vagina. An examination revealed an infiltration of the vaginal vault and anterior rectal wall by the cancer. June 18, 1914, 50 mg. radium element in 1 mm. brass capsule — 2,250 mg. hours. June 21, 1914, condition unchanged. Patient is now more alarmed about her condition; 50 mg. radium element in 3 mm. lead filter — 950 mg. hours. The total amount given is 4,950 mg. hours. At the present writing, i.e., October 5, 1914, the patient is profoundly cachectic and in a moribund condition. Death is only a question of weeks.

CASE 6. Mrs. M. R., age 43; III-para, Augustana Hospital, Nos. 40,723, 40,585 and 40,202, referred by Dr. Ochsner. Clinical diagnosis: Inoperable cancer of the cervix in the form of an ulcer involving anterior wall and extending into right parametrium. June 7, 1914, a portion of tissue was removed for microscopic examination which showed cancer. June 7, 1914, 5, p.m. to June 11, 1914, 8 a.m., 50 mg. radium element with 1 mm. lead filter were inserted into the cervical canal—4,350 mg. hours; 120 x massive X-rays were also applied. The patient developed an attack of uncontrollable vomiting on June 12, 1914, and became extremely nervous. It subsided under treatment within one week. June 17, 1914, a portion of tissue was excised for microscopic examination which revealed a squamous cell cancer. Application of 2,200 mg. hours radium element with 50 mg. radium element in 1 mm. lead filter introduced into the cervical canal. July 29, 1914, 2,200 mg. hours were given with 50 mg. radium element in 1 mm. lead filter. August 2, 1914, 500 mg. hours were given under the same conditions. The patient had now received 9,250 mg. hours of radium element. Her subjective condition had remarkably improved. The uterus could plainly be palpated, but was firmly adherent to the rectum. August 5, 1914, an abdominal panhysterectomy with resection of the involved portion of rectum was performed by Dr. A. J. Ochsner. The patient at first made a slow recovery from the operation, but as she was a nervous person, she could not be induced to subject herself to any further treatment on account of the severe symptoms which the radium treatment caused. She soon began to fail, and died October 4, 1914, from a general carcinomatosis. Microscopic examination of tissues from the sigmoid showed carcinoma, from the apex of broad ligament carcinoma and from uterus also squamous cell cancer.

CASE 7. Mrs. G. W., age 48; married; XIII-para, admitted August 9, 1914, Augustana Hospital, No. 40,568; referred by Dr. A. J. Ochsner. Clinical diagnosis: Carcinoma cervicis uteri with involvement of right parametrium. The ulcer has destroyed the entire right half of the cervix; chronic endocarditis with lost compensation. July 19, 1914, 50 mg. radium element in 2 mm. lead filter—1,150 mg. hours. July 28, 1914, 50 mg. radium element in 2 mm. lead filter—1,100 mg. hours. August 4, 1914, 50 mg. radium element in 2 mm. lead filter — 650 mg. hours. August 8, 1914, 50 mg. radium element in 2 mm. lead filter — 750 mg. hours. August 10, 1914, the patient expired from a progressing discompensation of the heart. The local condition had changed but very little.

CASE 8. Mrs. L. R., age 32; married 9 years; II-para; Augustana Hospital, No. 41,305; referred by Dr. N. M. Percy. Clinical diagnosis: Inoperable cauliflower cancer of cervix uteri.

Treatment: October 7, 1914, cauterization of vagina and cervix with actual cautery. October 17, 1914, 50 mg. radium element in 1.5 mm. brass filter and a 1 mm. rubber protector were inserted into crater for forty-four hours —2,200 mg. hours. The odor and offensive discharges changed immediately to odorless serous ones. October 22, 1914, 50 mg. radium element in 1.5 mm. brass filter and a 1 mm. rubber protector were inserted into crater for 36 hours — 1,800 mg. hours. Crater is now covered with healthy granulations. All necrotic tissue has disappeared.

CASE 9. Mrs. A. N. S., age 53; married, Augustana Hospital No. 41,221; admitted September 24, 1914, referred by Dr. N. M. Percy. Clinical diagnosis: Inoperable carcinoma cervicis uteri involving vaginal vaults.

Treatment: September 26, 1914, cauterization of cervix and vagina with actual cautery. October 19, 1914, 50 mg. radium element in 1.5 mm. brass filter and 1 mm. rubber cot were inserted into the crater for 47 consecutive hours—2,350 mg. hours. The putrid discharge changed to an odorless and colorless one. October 26, 1914, 50 mg. radium element were given again, used as before — 2,300 mg. hours. November 1, 1914, 50 mg. radium element inserted — 2,200 mg. hours. Crater now looks healthy, discharge is serous. Total amount given 6,950 mg. hours.

CASE 10. Mrs. A. K., age 66; admitted April 22, 1914; referred by Dr. A. J. Ochsner; Augustana Hospital No. 39,778. Clinical diagnosis: Inoperable cancer of uterus.

Treatment: April 23, 1914, cauterization of cervix with actual cautery; exploratory laparotomy; inoperable cancer. May 12, 1914, 50 mg. radium element in 2 mm. lead filter to crater in cervix — 1,000 mg. hours. May 15, 1914, 25 mg. radium element in 2 mm. lead filter to crater in cervix — 520 mg. hours. May 17, 1914, 25 mg. radium element in 2 mm. lead filter to crater in cervix — 650 mg. hours. June 22, 1914, 50 mg. radium element in 3 mm. lead filter to crater in cervix — 1,800 mg. hours. July 5, 1914, 50 mg. radium element in 1.5 mm. brass filter to crater in cervix — 2,350 mg. hours, making a total of 6,320 mg. hours.

A report, received October 23, 1914, states that the patient is suffering from a continuous pain in depth of small of pelvis and can hardly sit up on account of a swelling in the vulva. Urination and defecation are very painful.

CASE 11. Mrs. B. H., age 48; 0-para, married; referred by Dr. A. J. Ochsner, on May 30, 1914; Augustana Hospital Nos. 38,223 and 40,098.

History: November 3, 1913, excochleation and cauterization of carcinoma portionis vaginalis. Now pain in pelvis, constipation, continuous hæmorrhagic, putrid, vaginal discharge, loss of weight and strength. Examination reveals an involvement of the entire vaginal canal and the posterior commissure. Examination of excised piece of involved tissue shows squamous cell cancer. May 30, 1914, 50 mg. radium element in 1 mm. lead filter to vagina — 2,450 mg. hours. July 3, 1914, patient states that she feels much improved, has no discharge and is gradually gaining in strength. July 9, 1914, 50 mg. radium element in 3 mm. lead filter to vagina—1,259 mg. hours. July 14, 1914, 50 mg. radium element in 3 mm. lead filter to vagina — 2,400 mg. hours. July 30, 1914, 50 mg. radium element in 3 mm. lead filter to vagina — 650 mg. hours. August 13, 1914, 50 mg. radium element in 3 mm. lead filter to vagina — 1,800 mg. hours. August 21, 1914, 50 mg. radium element in 3 mm. lead filter to vagina — 1,200 mg. hours. August 24, 1914, 50 mg. radium element in 3 mm. lead filter to vagina — 1,900 mg. hours. August 31, 1914, 50 mg. radium element in 3 mm. lead filter to vagina — 1,200 mg. hours. September 24, 1914, 50 mg. radium element in 3 mm. lead filter to vagina — 1,175 mg. hours.

The patient received, at intervals of three weeks, six daily applications of deep X-rays, a total of about 400 x. She is now subjectively well. The cancerous masses have disappeared entirely. The vagina is contracted, hardly permitting the introduction of the little finger. The mucous membrane is smooth and healthy looking. The total amount of radium given is 11,575 mg. hours. Ex-

amination, October 20, 1914: The vaginal canal is covered with a white membrane, shaggy in places. General condition continues to be satisfactory except that in my opinion she has lost some in weight and strength. An examination made November 6, 1914, reveals a vesico-vaginal fistula, involvement of bladder, gradually increasing cachexia.

The immediate results of radium treatment were remarkable and coincide with those reported by other investigators in the same field. However, the marked improvement, "the subjective cure" as the Germans call it, is only temporary. Whether this temporary cure is greatly influenced by the fact that all these cases were operated if they became operable, is doubtful. I adhere to the principle that a cancer must be treated surgically if possible and followed by radiotherapy which latter becomes a valuable adjunct to surgery. Case 2 is the only one in this series that seemingly is clinically cured. However, the time is too short to call the result a permanent i.e., an anatomical cure. Cases 8 and 9 are too recent to permit of any conclusions.

In the following paragraphs I shall discuss six cases of recurrent cancers of the uterus.

CASE 12. Mrs. A. McQ., age 28; 0-para; admitted March 23, 1914; referred by Dr. A. J. Ochsner; Augustana Hospital No. 39,615. Patient had a hysterectomy last fall, but the wound never healed. She has a continuous malodorous watery and bloody discharge from the vagina, and frequent micturitions. Diagnosis: Recurrent uterine cancer involving the entire vagina, vulva, and perineum.

Treatment: Intravenous injection of 0.6 ccm. neosalvarsan. April 25, 1914, 50 mg. radium element in 3 mm. lead filter and 1 mm. rubber cot were inserted in the vaginal canal — 1,200 mg. hours. May 1, 1914, same to perineum — 525 mg. hours. May 6, 1914, same to vagina — 1,150 mg. hours. May 13, 1914, same to perineum — 500 mg. hours, making a total of 3,375 mg. hours.

Cancerous odor and profuse discharge disappeared after the first treatment. After the third treatment a high continuous temperature appeared, with all the symptoms and signs of a general intoxication. The patient died.

CASE 13. Mrs. A. D., age 32; 0-para, admitted April 29, 1914; referred by Dr. N. M. Percy; Augustana Hospital No. 39,873.

Diagnosis: Cancer of rectum involving posterior vaginal wall, vulva, and anal region. A microscopic examination of tissue reveals an adenomatous papilloma malignum.

Treatment: June 1, 1914, 50 mg. radium element in 2 mm. lead filter to rectum — 1,050 mg. hours. June 5, 1914, 50 mg. radium element in 2 mm. lead filter to rectum — 2,750 mg. hours. June 22, 1914, 50 mg. radium element in 2 mm. lead filter to rectum — 1,600 mg. hours. June 25, 1914, 50 mg. radium element in 3 mm. lead filter to rectum — 2,200 mg. hours.

Patient received 7,600 mg. hours of radium element without any improvement following. Her subjective and objective condition did not change. August 17, 1914, 50 mg. hours radium element in 3 mm. lead filter to rectum — 600 mg. hours. August 19, 1914, 50 mg. radium element in 3 mm. lead filter to rectum — 1,700 mg. hours. The additional 2,300 mg. hours also were not productive of any changes. The treatments were discontinued.

CASE 14. Mrs. K., age 38; referred by Dr. D. A. Orth; St. Mary's Hospital, No. 24,058. Diagnosis: Recurrent cancer of uterus involving vagina and posterior wall of bladder. Microscopic diagnosis: Squamous cell cancer.

History: In 1912, patient had a circular amputation of cervix; January 9, 1913, an abdominal supravaginal hysterectomy; and September 16, 1913, a vaginal cauterization for cancer of the cervical stump. She was admitted to the hospital March 13, 1914, on account of profuse vaginal discharges, hæmorrhages and severe abdominal pain and rapid loss of weight and strength. Examination revealed an involvement of the entire vaginal walls, and portions of bladder, rectum, and some portions of the posterior fourchette. Patient was profoundly cachectic.

Treatment: April 6, 1914, 50 mg. radium element in 2 mm. lead filter to vagina — 500 mg. hours. April 10, 1914, 50 mg. radium element in 2 mm. lead filter to vagina — 600 mg. hours. April 14, 1914, 50 mg. radium element in 2 mm. lead filter to vagina — 575 mg. hours. April 18, 1914, 50 mg. radium element in 2 mm. lead filter to vagina — 600 mg. hours. April 23, 1914, 50 mg. radium element in 2 mm. lead filter to vagina — 1,200 mg. hours. April 27, 1914, 50 mg. radium element in 2 mm. lead filter to vagina — 525 mg. hours. May 8, 1914, 50 mg. radium element in 2 mm. lead filter to vagina — 1,150 mg. hours, making a total of 5,700 mg. hours.

Patient did not improve at first except that the discharge, odor, and bleedings disappeared entirely. She had no secondary symptoms. However, in the latter half of June her subjective condition improved rapidly, her strength returned, the pain disappeared entirely and she began to be up and about. During August a large vesico-vaginal fistula formed. The patient rapidly failed, and returned to her former desolate condition. She died September 21, 1914.

CASE 15. Mrs. C. P., age 63; married; referred by Dr. A. J. Ochsner; Augustana Hospital No. 40,270. Clinical diagnosis: Recurrent cancer involving vaginal vault.

Treatment: June 13, 1914, 50 mg. radium element in 1 mm. lead filter to vagina — 2,575 mg. hours. Patient did not return for any further treatments. Inquiry by mail unanswered.

CASE 16. Mrs. A. H., age 61; I-para, Augustana Hospital, No. 40,717; referred by Dr. Ochsner. One full-term labor twenty-seven years ago, after twelve years of married life. Patient never had any menstrual disturbances. History: Four years ago vaginal panhysterectomy for beginning cancer of cervix uteri after patient had had a bloody discharge from vagina for about one week. June 10, 1914, patient noticed a general weakness and July 8, 1914, a profuse leucorrhœal and bloody discharge from vagina. Diagnosis: Recurrent cancer in the scar of the vaginal vault, size of pea.

Treatment: July 23, 1914, 50 mg. radium element in 1 mm. lead filter to vaginal vault — 3,600 mg. hours. July 31, 1914, cauterization of ulcer with actual cautery. August 5, 1914, 50 mg. radium element in 1.5 mm. brass filter — 3,400 mg. hours.

Patient did not feel any the worse from this treatment except that she seemed to be somewhat weakened and despondent and had a profuse watery discharge from the vagina. During the latter part of August 450 mg. hours of radium were applied by Dr. Abbe, New York, while patient was in the East, because she had noticed an increased watery discharge. September 27, 1914, 1,050 mg. hours of radium element in 1.5 mm. brass filter were applied. A nodular formation in the vaginal scar the size of a peppercorn was still present. October 16, 1914, 1,200 mg. hours of radium element in 1.5 mm. brass filter were applied. Nodule had disappeared. Patient feeling well as ever.

CASE 17. Mrs. M. P., age 44; o-para; Augustana Hospital, No. 40,456; admitted July 4, 1914; referred by Dr. A. J. Ochsner.

History: Three years ago an abdominal panhysterectomy was performed for carcinoma cervicis uteri. Patient remained well up to March, 1914, when she began to vomit two to three times daily. In May she began to have gas pains and a purulent putrid discharge from the vagina.

Diagnosis: Recurrent cancer in right broad ligament. On July 10, 1914, an opening was made in the mass through the vaginal vault and 50 mg. radium element were inserted until 3,500 mg. hours had been given. The patient developed a vesicorectovaginal fistula after removing the radium capsule. She lost gradually in strength, was unable to be up, and expired on August 7, 1914.

Six cases of recurrent cancers were treated. One, Case 16, showed a beginning recurrence. Radium treatment has, for the present, stopped an increase in the local condition, and caused it to disappear. One case had not advanced far but withdrew from any further treatment (Case 15). Cases 12, 13, 14, and 17 were far advanced and extensive recurrences. Two died almost immediately (Cases 12 and 17); one was entirely refractory (Case 13), and one showed a transitory improvement (Case 14.)

I will now report three cases which were subjected to an abdominal panhysterectomy preceded by a vaginal cauterization. In these cases radium was used prophylactically to destroy any cancer-cells or nests that might have been left behind and thus to prevent recurrences.

CASE 18. Mrs. H. F., age 64; V-para; admitted April 19, 1914, Augustana Hospital, No. 39,755; referred by Dr. A. J. Ochsner. Clinical diagnosis: Carcinoma cervicis uteri. Microscopic diagnosis: Carcinoma.

Treatment: April 20, 1914, cauterization of uterus with actual cautery. April 24, 1914, abdominal panhysterectomy. May 15, 1914, 25 mg. radium element in 2 mm. lead filter inserted into broad ligament — 525 mg. hours. May 17, 1914, 25 mg. radium element in 2 mm. lead filter inserted into broad ligament — 650 mg. hours. May 19, 1914, 50 mg. radium element in 2 mm. lead filter inserted into broad ligament — 650 mg. hours. May 22, 1914, 50 mg. radium element in 2 mm. lead filter inserted into broad ligament — 525 mg. hours. May 29, 1914, 50 mg. radium element in 3 mm. lead filter inserted into broad ligament — 1,175 mg. hours, making a total of 3,525 mg. hours.

Patient left hospital on this date. The wound in the vagina was healthy looking and covered with profuse granulations. An inquiry as to present condition, sent October 20, 1914, was not answered.

CASE 19. Mrs. E. R., age 39; o-para; admitted August 25, 1914; referred by Dr. A. J. Ochsner. Clinical diagnosis: Carcinoma cervicis uteri; adnexal disease. Microscopic diagnosis: Squamous cell cancer. Patient for past year has had irregular, delayed menses and profuse leucorrhœa and of late pain in right hypogastrium, uterine hæmorrhages, and pyorrhœa.

Treatment: August 26, 1914, abdominal panhysterectomy with removal of upper one inch of vaginal canal, appendectomy for purulent chronic appendicitis. A vesicovaginal fistula formed during convalescence. September 5, 1914, 50 mg. radium element in 1.5 mm. brass filter into broad ligament — 2,000 mg. hours. Odor and discharge diminished after this treatment. September 11, 1914, 50 mg. radium element in 1.5 mm. brass filter into broad ligament — 1,250 mg. hours. Healthy granulations have replaced the necrotic tissues. September 15, 1914, 50 mg. same conditions and place — 1,125 mg. hours. October 14, 1914, 50 mg. same conditions and place — 1,300 mg. hours, making a total of 5,675 mg. hours.

Patient until now has received 5,675 mg. hours radium element. She has improved in every respect, her pale cachectic color of skin has changed to a healthy color. The vesicovaginal fistula still persists. A persistent temperature developed after second and third applications. Fever was 101° to 103° F. and lasted about 3 to 4 days.

CASE 20. Mrs. E. B., age 57; I-para; admitted September 24, 1914, Augustana Hospital, No. 41,218; referred by Dr. A. J. Ochsner. Clinical diagnosis: Cauliflower cancer of cervix uteri. Microscopic diagnosis: Carcinoma.

Treatment: September 25, 1914, vaginal cautery and abdominal panhysterectomy; drainage through vagina and abdominal incision; posterior vesical fistula discharging through abdominal wound and vagina complicated convalescence. October 10, 1914, 50 mg. radium element in 1.5 mm. brass filter — 2,750 mg. hours. October 24, 1914, 50 mg. radium element in 1.5 mm. brass filter — 2,400 mg. hours. Patient is up and about. The urinary fistula has closed. The vaginal wound is healthy looking and covered with granulations.

Finally, I wish to add the reports of three cases of rectal cancers.

CASE 21. Mr. Ed. J. J., age 57, admitted June 30, 1914. St. Mary's Hospital, No. 25,176. Clinical diagnosis: Carcinoma recti. Microscopic diagnosis: Adenocarcinoma of rectum, carcinomatous lymph-nodes. Cachexia and secondary anæmia are marked.

Treatment: July 2, 1914, resection of about 8 inches of lower portion of rectum with metastatic lymph-nodes. July 16, 1914, 50 mg. radium element in 2 mm. lead filter inserted about six inches up in rectum — 600 mg. hours. July 21, 1914, 50 mg. radium element under same conditions and same place — 400 mg. hours. August 14, 1914, 25 mg. in 3 mm. lead filter inserted in same place — 575 mg. hours. The last application was followed by a continuous high temperature accompanied by a great loss of strength lasting for one week. October 24, 1914, examination revealed a healthy looking normal rectum. The sphincter ani still acts defectively. The general physical condition is good, and the patient is ready to return to work.

CASE 22. Mr. J. E., age 74; admitted June 29, 1914, Augustana Hospital, No. 40,405; referred by Drs. Frick and Ochsner. Clinical diagnosis: Cancer of bladder, invading rectum. Microscopic diagnosis: Carcinoma.

Treatment: July 17, 1914, prostatectomy and partial resection of rectum. August 3, 1914, 25 mg. radium element in 1 mm. lead filter into perineal opening — 525 mg. hours. August 8, 1914, 25 mg. in 1 mm. lead filter in same place — 425 mg. hours. August 15, 1914, 50 mg. in 2 mm. lead filter in same place — 800 mg. hours. August 23, 1914, 50 mg. in 2 mm. lead filter in same place — 600 mg. hours. September 1, 1914, 50 mg. in 2 mm. lead filter in same place — 800 mg. hours, making a total of 3,150 mg. hours.

Patient up to the present has steadily improved, but hesitates to return for further treatments on account of the vesical and rectal tenesmus caused by the application of radium.

CASE 23. Mrs. L. J., age 26; o-para, admitted June 22, 1914; referred by Dr. Ochsner; Augustana Hospital, No.

40,349. Clinical diagnosis: Inoperable cancer of rectum, invading rectal walls all around for about two inches and about two inches superior to anus causing a complete stricture of rectum. A permanent colostomy was performed.

Treatment: July 29, 1914, 50 mg. radium element inclosed in 1 mm. lead filter and 1 mm. rubber cot was inserted into rectum — 575 mg. hours. August 2, 1914, 50 mg. radium element was inserted as before. Patient removed it after six hours on account of an unbearable rectal tenesmus. August 9, 1914, 25 mg. radium element inserted for twelve hours — 300 mg. hours. The patient suffered severely from rectal tenesmus, although morphia was given hypodermatically. On this account she refuses any further treatment. The total amount given was 1,175 mg. hours. This case should have been added to the cases of inoperable cancers.

The last six cases are too recent to permit of drawing any final conclusions. The profuse vaginal and abdominal discharges characterized by a penetrating putrid odor invariably cleared up and turned odorless after about 2,000 mg. hours of radium element had been given. Not only this, the wound also seemed to heal much more rapidly, indicated by the abundant healthy granulations which speedily replaced the necrotic tissue. The radium also asserts a beneficial action on rectal cancers as demonstrated by Cases 21 and 22.

In summing up the primary results, I come to the following conclusions:

1. In inoperable cases the immediate results of radium treatment are good: hæmorrhage, pain, and profuse putrid discharges cease. This improvement is only of short duration and additional applications of radium do not bring about an improvement. The results, however, equal those of any other known treatment. Only one of the twelve cases has shown encouraging results.

2. Recurrent cancers, if far advanced, are very refractory to radium treatment. The result of radiotherapy is practically nil. However, in the beginning and localized recurrences, radium seems to produce pronounced beneficial results and is the most valuable therapeutic agent we possess.

3. It is impossible to draw any conclusions as to the remote results from the prophylactic use of radium after radical operations for cancer, on account of the short time which elapsed since the treatment. The primary results are very good. The necrotic tissue is rapidly replaced by healthy granulations and the profuse purulent and putrid discharge changes to serous and odorless secretion. As to the late results I will report at a future time.

We cannot form final conclusions regarding the use of radium in uterine and rectal cancers until more time for observation has elapsed. The primary results, however, have been very promising. Possibly by the use of larger amounts of radium, or by an improvement in the technique, or by the most careful selection of cases and the establishment of definite indications, the primary, as well as the remote, results may improve. I am inclined to the firm belief that radium possesses a remarkable therapeutic action and will become an indispensable adjunct in the routine treatment, not only of cancer, but also of a great number of other diseases, especially lupus, sarcoma, benign uterine tumors, and metropathic hæmorrhages.

CORRESPONDENCE

A MODIFIED INCISION FOR APPROACHING THE GALL-BLADDER

To the Editor:

In the issue of SURGERY, GYNECOLOGY AND OBSTETRICS for January, 1915, in the Department of Technique, there appears an article by Dr. L. L. McArthur, of Chicago, entitled "A Modified Incision for Approaching the Gall-Bladder." From reading this article, one infers that it is intended to be published as a new incision. If this is so and any priority is to be claimed or established, I desire to submit a reference to an article published by myself in the *Lancet-Clinic*, of Cincinnati, under date of December 21, 1912, where I published what I chose to term "A New Incision for Gall-Bladder Work—A Gridiron."

The description given by Dr. McArthur, in import as well as illustrative description by pictures, is exactly what I described more than two years ago. I will repeat, quoting from my original publication, the following:

Incision. Vertical through the skin, fat, external fascia of the rectus muscle, down to the posterior sheath

of the rectus (outer border); then free all tissue from the transversalis fascia and muscle for some distance all around, and make the incision through the transversalis and peritoneum in the direction of its fibers, which run nearly transversely. This transverse separation of the transversalis muscle and fascia fibers can be from three to six inches in length, and can be very easily retracted up and down. No fibers are cut transversely, but are divided as a gridiron appendix incision.

Its advantages are:

1. It gives free access to a larger portion of the border of the liver, gall-bladder, and ducts.
2. It does not injure any of the transverse support of the costal arch or angles, or injure the trophic nerve supply.
3. *Most important of all*, it can be very easily closed—even overlapped — without any tension on the sutures.
4. It should hold the same relation, at least theoretically, to the prevention of post-operative hernia in this region that a gridiron incision does to the appendix operation.
5. It makes what is often the most difficult part of the operation very easy; viz., closing the transversalis fascia.
6. When the wound is closed, it restores the support of the costal angle, and post-operative pain is reduced, possibly 75 per cent, if my cases can be considered a test.

I am very enthusiastic over the great advantages to be gained by this slight change in technique and hope my surgical friends will be good enough to test it further.

I have not been able to find this type of incision advocated in any of the surgeries I have consulted, and have not seen or known of its previous publication. I am convinced that any one who will use it two or three times will use it oftener.

The best article I have seen on "Incision for Gall-Bladder" was by Dr. R. E. Farr, of Minneapolis, in which he speaks of a transverse incision, but this is not a gridiron incision. His article was published prior to mine.

CHARLES F. SOUTHER, M.D.

Cincinnati, Ohio.

To the Editor:

In the January, 1915, issue of SURGERY, GYNECOLOGY AND OBSTETRICS, Dr. L. L. McArthur describes an incision for certain gall-bladder operations which consists of a vertical division of the skin and structures down to the posterior surface of the rectus, and a separation of the posterior layer of the internal oblique and the transversalis parallel to their fibers nearly transversely. In 1903 I used this incision and decided that the vertical division of the skin and external oblique could be dispensed with. So I began making a nearly transverse incision, incising the skin parallel to the direction of the fibers of the external oblique separating the fibers of the external oblique, then dealing with the internal oblique and transversalis as recommended by Dr. McArthur; and, when necessary, dividing the rectus transversely.

This is the incision described by Kausch. I presented it, with its modifications and extensions to the Southwest Medical Society at Oklahoma City, October 11, 1911.

I desire to say a word in favor of the oblique Kausch incision, and the transverse incision of Sprengel which is made at any level desired according to the case. These incisions are entirely sufficient for simple cases involving the gall-bladder, cystic, or common ducts. They afford ample exposure, are easily closed, and practically do away with post-operative hernias.

For the most complicated cases, and especially cases previously operated upon through a vertical incision, Czerny's *winkelschnitt*[1] as modified by Kehr[2] is advised. This is a right-angled incision. A vertical cut in the median line connects with a transverse incision extending to the right costal margin. Czerny extended the vertical part of the incision to the navel, although Kehr has pointed out that it is not necessary to go so low as the navel. This incision saves time and trouble in complicated cases, for it exposes the entire biliary area from the free peritoneal side.

All of these incisions are adequately dealt with by Kehr.[3] Sprengel's work is more fully discussed in the *Archiv für klinische Chirurgie*, 1910.

JOHN G. SHELDON, M.D.

Kansas City, Missouri.

To the Editor:

Your letters received with enclosures from Drs. Souther and Sheldon.

I quote from the original copy of a letter written to Dr. Souther, January 15:

"Let me thank you for sending me a marked copy of the *Lancet-Clinic* of December 21, 1912. I am very much interested in the article which is absolutely in agreement with my experience with the incision. I must congratulate you on being the first in print with the same.

"I will endeavor to find for you a reprint of an article of mine written in May, 1894, which antedated by three months McBurney's publication of the muscle-splitting proposal and recommended the use of this muscle-splitting method as applicable to many situations in the abdomen, gall-bladder, kidney, appendix, artificial anus, etc. Unfortunately the Chicago Medical Society failed to publish my article until November, and McBurney secured the credit by publishing in July of the same year."

I note from Dr. Sheldon's letter that he claims priority over Dr. Souther by nearly ten years.

Chicago. L. L. MCARTHUR, M.D.

[1] Beitr. z. klin. Chir., 1892.
[2] Arch. f. klin. Chir., 1912.
[3] Chirurgie des Gallennege, 1913.

TRANSACTIONS OF SOCIETIES

CHICAGO GYNECOLOGICAL SOCIETY

REGULAR MEETING, DECEMBER 18, 1914, WITH THE PRESIDENT, DR. ROBERT T. GILLMORE, IN THE CHAIR

EXHIBITION OF SPECIMENS

DR. RUDOLPH W. HOLMES: I have here a uterus with a uterine polyp which caused some difficulty in the differentiation between the actual pathologic finding and pregnancy. Three years ago this month I removed four small subserous fibroids, and corrected a retroversion by the so-called Andrews-Webster operation. On recovery from the operation the patient was symptomatically well until a year ago when she was sorely distressed by pudendal itching. After topical treatment, and later the application of the X-ray, proving ineffectual, she was curetted on account of a leucorrhœa of a uterine origin. The uterus at this time was small, immature. I saw her again recently after she had endured a profuse menorrhagia for some six months. At this time her uterus was that of a four months' pregnancy, soft in consistency, and globular. The diagnosis of submucous fibroid having been made, a hysterectomy was planned. At the time of operation a preliminary curettage was undertaken for the purpose of rendering a more perfect toilet by cleansing the uterus of the cause of a leucorrhœa. It was easily possible to explore the uterine cavity with the finger—the entire uterine wall was of uniform thickness, greatly hypertrophied, although the posterior wall near the fundus was roughened. As during the night a membrane was expelled, perhaps three inches by one inch, which had some appearance of a decidual membrane, it was thought expedient to temporize before removing the uterus, as in spite of the absence of a definite history of a pregnancy such might have been the case, and as I have seen a number of cases of greatly hypertrophied uteri containing molar pregnancies which closely resembled this case.

The curettage was done on a Tuesday; the following Monday, on account of some slight uterine sanguinolent discharge I ordered small doses of ergot. Promptly thereafter she began to have severe expulsive pains as of advanced labor. These pains continued intermittently until Wednesday when Dr. Watkins was good enough to see her with me, and corroborated the opinion that the operation should not be deferred. The next afternoon I did the supravaginal hysterectomy. The operation was difficult, as the uterus and bladder were covered by broad firm intestinal adhesions which were separated with some considerable trouble.

On opening the uterus we found a large submucous fibroid which had its site on the upper posterior wall its tip just touching the internal os. One may see surrounding the base of the tumor a dense fibrous layer, the capsule, which undoubtedly was broken by the curettage; and then the tumor was extruded by the contractions stimulated by the ergot. I might add that the membrane expelled before the previous operation was fibrous tissue thickly infiltrated with large cells which could not be recognized as decidual cells.

The second specimen I shall show is that of a ruptured appendix removed in the fifth month of pregnancy. In itself the appendix does not offer anything unusual except perhaps the presence of the large enterolith (nearly a quarter of an inch in diameter). The woman was twenty-eight years of age; when fourteen she had a severe attack of appendicitis which was treated expectantly and she has not had an attack in these fourteen years. Her last menstruation was on June 26. On Sunday, November 15, after her usual dinner she was seized with vomiting, which recurred two or three times in the next few hours. Shortly after the first emesis she had a localized pain in the epigastrium. No temperature was evidenced then, and only 99° the next day. She would not countenance my being called as she felt that it was a stomach attack due to pregnancy, which, while not usual with her, had occurred on previous occasions. Monday morning the epigastric pain had ameliorated, but some more emesis. No tenderness or rigidity at any point of the abdominal wall. Tuesday morning at three o'clock the pain transferred its point to that of McBurney's. I saw her at eleven o'clock and sent her to the hospital. Her blood count was 16,000.

The cæcum was delivered through a small incision, and the appendix easily removed; as the appendix had practically no meso-appendix the control of bleeding was more than ordinarily difficult on account of the friable tissue. While removing the appendix it ruptured and the stone was extruded. There was no injection of the cæcum or adjacent peritoneum. On account of the rupture a cigarette drain was placed and the wound closed. For two days her convalescence was unusually calm, no pain or discomforts of any kind. On Thursday she was given an enema with a return of mere flecks of fæcal matter. For the next seven days a bowel movement was not secured, nor did she pass gas though she had frequent attacks of belching. For an hour on Saturday she had some pain. The abdomen was tympanitic, but soft. On the eight day after the operation she miscarried without pain or any discomfort. During this time it was held she had an adynamic ileus. On the ninth day after the operation she suddenly began to have bowel movements, and passed much gas. From then on her convalescence was marked. On the fifteenth day she was sitting up in bed, and had her first taste of solid food, a small piece of milk toast. Shortly after taking this milk toast she was seized with pain, which continued intermittently until the next day; then it became rhythmic, the tympany accentuated, and by evening it was determined she had an actual dynamic ileus. The abdomen was again opened, in the midline. As the peritoneum was nicked there was a gush of gas audible to all in the room. On entering the abdomen a collapsed bowel was found under the incision with a rent in it over two inches long; undoubtedly, as counter pressure of the abdominal wall was removed the paretic distended bowel actually exploded. Some delicate adhesions were separated, relieving kinks and reducing distended

intestines. The cavity was washed out with saline solution. During the night her bowels moved, gas passed repeatedly. In severe pain she died suddenly some sixteen hours later.

The fact that the pain was localized so long, 36 hours, in the epigastrium was unusual; with so many other obstetric conditions which may cause epigastric pain in consideration it was impossible to place the correct interpretation until localization of the pain had occurred in the appendiceal region. This difficulty in early recognition, I believe, is more the cause of the risks of appendicitis in pregnancy than the direct result of disturbed anatomy due to pregnancy, and when accompanied by an essentially normal pulse and temperature the problem is still more complicated.

CASE OF PSEUDODIPHTHERITIC CYSTITIS

DR. ARTHUR CURTIS: The bacteriologic findings in the case that I wish to discuss will be reported by Dr. Moody in a detailed report later, so I will not go into them.

The patient is a woman in the service of Dr. Wilson in St. Luke's Hospital. She is 52 years of age. She has had three normal births without any complication of any sort and neither catheter nor sound has ever been passed. There was nothing in the history that would in any way indicate an artificial introduction of the organism into the urinary tract. About ten years ago, two of her children had very virulent infection with diphtheria bacilli, one with associated paralysis. One of these children was so sick that they despaired of its life being saved. Otherwise there was nothing of interest in the history, until the bladder trouble began about a year ago last April, when there was noticed for the first time a very marked distress upon urination, the passage of small concretions from the bladder, and also at quite frequent intervals the passage of blood in the urine. This was quite intimately mixed at times, but on other occasions the urine was only streaked with blood. At the time I cystoscoped her, some three or four months ago, the bladder picture was quite unusual. The bladder wall was absolutely covered, except in one very small area in the fundus, with a thick membranous deposit. This membrane hung down from the fundus of the bladder, from the anterior wall and sides, just as stalactites hang down from the walls of a cave. The thickness of the membrane was difficult to judge because it covered the entire bladder-wall. It seemed, however, to be almost an inch in thickness in some places. The ureteral orifices could not be seen, of course. This membrane could not be dislodged by massage or other manipulations. Pieces of membrane that were passed at the time the bladder was washed out were saved, and others collected at a later date. On laboratory examination they showed a culture which resembled the diphtheria bacillus. Likewise, cultures made from the urine showed a pure culture of the same organism. There seemed no doubt that we had to do with a pure infection with an organism of the diphtheria group. There were, of course, no crystals to be seen, and no evidences of stone, because of the membrane over it. At a later date — some two weeks ago — I again cystoscoped the patient, at which time we found that the membrane had disappeared in great part. In the meantime vaccines had been given for a period of three months, with only moderately satisfactory results, as regards the symptoms. Dr. Watkins then performed a vaginal cystotomy, and found, in addition, calcareous crystals in the submucosa. These were variable in size.

DISCUSSION

DR. THOMAS J. WATKINS: It may be of some interest to call attention to how deeply these crystal deposits were embedded in the mucous membrane. It was difficult to dislodge them. Some were dislodged superficially with the finger, and some were scraped away with a blunt curette, but it did not seem advisable to try to remove them all on account of the great amount of traumatism which such a procedure would entail. We depended upon the drainage and the use of the benzoic acid to get rid of the deposits that were deeply embedded.

One thing occurred in this case which is quite interesting in cystotomies in the female, and that is the difficulty to obtain perfect drainage. In an ordinary vesicovaginal fistula it is difficult to prevent all the urine from escaping, and in an artificial opening it is difficult to obtain incontinence of urine. It is a problem as to how best to manage that — whether it would be better simply to depend upon a linear incision, or whether it would be better to remove considerable of the mucous membrane of the vagina, so that the bladder mucosa would evert and give complete drainage. It is impracticable to put any drainage material into the bladder on account of the amount of irritation which would result.

This woman has been kept on about twenty-grain doses of benzoic acid daily, and the urine has become acid; it is becoming quite clear. She passes about half of the urine voluntarily — possibly while lying down.

DR. CURTIS (closing the discussion): Regarding the establishment of drainage, it is my belief that in the majority of instances in which the patient is able to empty the bladder thoroughly, the establishing of drainage through cystotomy or by irrigation of the bladder is not ordinarily indicated. We feel that it is only under very exceptional circumstances that the forming of an artificial opening through making a vaginal cystotomy, a vesicovaginal fistula, or irrigating of the bladder is advisable. Such treatment we reserve for cases where there is retention of urine.

SOME RARE FŒTAL TERATISMS WITH ILLUSTRATIVE CASES

DR. W. A. N. DORLAND read a paper on "Some Rare Fœtal Teratisms with Illustrative Cases." (See p. 342)

DISCUSSION

DR. N. SPROAT HEANEY: Regarding the second specimen—the cranioparietalis type—in the *Semaine Médicale* about a year ago there was

a picture of just about the same sort of monster. The obstetricians were considering the question of operating at that time. The children were both alive. Afterwards I think they did operate, but what the outcome was I have forgotten.

DR. DORLAND: The case just referred to by Dr. Heaney was that of Bandouin; the babies are still united and living.

DR. HENRY F. LEWIS: I was particularly struck by the appearance of the radiogram of the specimen of acephalus dipus. The picture was only recently taken and I had not examined it before today. As you will notice, there is distinctly a cranium of fair capacity and a set of cervical vertebræ which constitute even an abnormally long neck, although there seems to be no trace of arms or shoulder girdle. Therefore this is really not a specimen of acephalus; rather is it one of amelus abrachius with excessive development of connective tissue which covers and conceals the head.

Ordinarily acephali have nothing above the level of the top of the sternum except the excessive amount of integument and subcutaneous connective tissue. Usually also they have no heart but depend for circulation upon the heart of the dominant twin.

DR. ARTHUR CURTIS: One time I was interested in monsters, and spent some three or four months in attempting to make a classificational study of the cells of the spinal cord. At the time when one finds the absence of a certain group of muscles or of one or more extremities, there is also an absence of the corresponding cells in the horns of the spinal cord. Inasmuch as the localization of these various centers is not as yet well established, I would suggest that if it were possible to remove these spinal cords to study the horn cells, it would be of considerable interest to neurologists.

DR. DORLAND (closing): I did not see the X-ray picture referred to by Dr. Lewis until today. I think, with him, that we should make a study of these monsters anatomically, and if Dr. Lewis, who now has charge of these specimens, has no objections, such an examination will be made. It is interesting to note in the so-called acephalic monster the presence of the bones of the skull. In no place have I found reference made to such a condition. I have made but a superficial search, having had only a few days in which to prepare this paper; however, I covered the literature for fifteen years, and I think I secured all the essential data. In no instance has a skull been mentioned in this variety of monster, and I believe that this is a unique specimen. The thorax is usually empty or contains but rudimentary organs. Sometimes the heart may show a fairly good degree of development.

OVARIAN TUMORS IN PREGNANCY

DR. W. C. DANFORTH read a paper entitled "Ovarian Tumors in Pregnancy, with a Report of a Case of Solid Tumor." (See p. 319.)

DISCUSSION

DR. THOMAS J. WATKINS: This Society has taken up this subject rather recently, with the paper Dr. Barrett read, and then in a joint meeting with the Philadelphia Obstetrical Society. It seems to me that it would be inadvisable to have a routine treatment for these cases. I believe the plan of procedure should be very largely a question to determine in each individual case, depending upon numerous facts, which are too numerous to take up here, and which are familiar to you all. I would be rather inclined to think it would be unwise to remove an ovarian cyst as soon as found. The ideal method in suitable cases is to let the pregnancy go on to term and remove the cyst and do cæsarean section at the same time. Dr. Danforth spoke of removing the tumor and then doing a cæsarean section. It seems to me it would be very much more advisable to do the cæsarean section and then remove the tumor in order to facilitate the operative technique. It seems to me that the statistics in a subject like this are apt to be very inaccurate, as there is a great tendency to report favorable and not to report the unfavorable cases. The statistics of this work prior to fifteen years ago are of very little value, as abdominal surgery has advanced much since that time.

DR. RUDOLPH W. HOLMES. I know we all face the thought when we have a pregnant woman who needs some abdominal surgery, Will the operation cause a miscarriage? I believe the statistics which present certain figures as the liability for miscarriage for particular lines of surgical intervention are specious. After long study of the abortion situation in the years I was on the abortion committee of the Chicago Medical Society, it was the opinion of that committee that abortions to full-time pregnancy was as one to two. With a risk of 50 per cent of pregnancies being terminated by criminal methods, it does seem innane to study these risks, and give too much faith to them when we consider doing what is best for the mother in the presence of actual pathology. However, I am sure for the usual case, surgery in the pregnant, as hysterectomy for fibroids, or the removal of ovarian

cysts early in pregnancy, is not doing the best for the woman, or most certainly for the unborn child: in the former certain destruction awaits the child, while in the latter interruption of pregnancy is common, and too often seriously complicates the condition of the mother. Therefore, in this matter of an ovarian cyst, short of some sudden acute development like a strangulated torsion of the pedicle, the best surgery is to await the time of full term, then determine the procedure to be undertaken.

It is not so much the size of the tumor as its location that will determine difficulty in labor. A small ovarian tumor lodged in the cul-de-sac, adherent, may offer insurmountable difficulties to spontaneous labor, or labor terminated by art through the natural channels, whereas a very large tumor may be so located, or so easily dislodged upwards, that without any complications or disturbances labor may go on to a spontaneous conclusion. Therefore, it is more the location than the actual size that decides the matter.

The risk of infection, particularly in dermoids, is, of course, great when left during the puerperium. It is difficult, yes impossible, to recognize dermoids positively; on the suspicion of a dermoid in pregnancy the sooner out the better. This subject came up last time in my report of double dermoids. I still firmly believe that dermoids, from their structural content, are more prone to infective processes than any other ovarian tumor, and on that account, whether of a low grade infection, or a very severe infection, prompts their early removal.

The ideal time to remove tumors ordinarily is near the time of full term, if they in any degree suggest a reasonable probability of interference to labor; if the tumor is to be removed, certainly the cæsarean section should be done first, and the tumor after. I believe cæsarean section should always be done rather than to remove the tumor, sew up, and then deliver spontaneously or by art.

The cæsarean should be done first, as immediately after the emptying of the uterus there is an enormous diminution of the blood supply through the broad ligaments, and the pelvis in general. Therefore, the hæmorrhage if any may be the more easily controlled after the cæsarean than before. Further, one may secure thorough hæmostasis if the tumor is first removed, but with the emptying of the uterus the sharp retraction may pull off the ligatures.

Dr. Channing W. Barrett: This specimen is interesting and rather rare, as compared with other cystic tumors; but the question of diagnosis between a solid tumor and a cyst is not very important, except perhaps that if it is a solid tumor it is apt to be malignant. The question, however, of whether a solid tumor of the ovary or a solid tumor of the uterus is present is an important one, because it is the consensus of opinion that ovarian tumors should be removed nearly always when found, while fibroids of the uterus, for very apparent reasons, should be left alone until they are decidedly giving trouble, since when we start in to operate on a fibroid tumor of the uterus in pregnancy we are attacking the organ that contains the ovum, and the condition is apt to end in a hysterectomy — although we may sometimes decide to do a myomectomy in such a case.

Just a word on the point of leaving this ovarian tumor alone, if the woman has not had any children — that is, if she has not a living child, and if, to the woman, the child *in utero* is important. If that child's chances are better if the ovarian tumor is left alone, then there is no reason why one should be in a hurry to remove it. It is because we improve the chances for the mother and the child by removing the tumor that that operation is done, and there is no question, from statistics, but that the mother's and the child's chances are decidedly improved by early removal of the ovarian tumor.

Then there is a further question of leaving this alone when there is a double tumor. If the uterus has to contend with two tumors inside of it, it is more apt to become irritable, and labor start, than if it has to contend with one; and statistics do not show that the patient cannot go on to full-term pregnancy with both tumors removed. Of course, it is true that experimental work has rather demonstrated that one ovary or part of an ovary is necessary to the uterus going on to term, but clinical work does not bear out that experimental evidence. A collection of cases shows that almost as great a percentage have gone on to full term where two tumors have been removed — both ovaries — as where only one has been removed. It is certainly true that a portion of an ovary should be left, if possible, but I do not think that the fact that the patient has two tumors should keep us from removing those tumors during pregnancy.

Dr. Curtis: Dr. Barrett, may I ask if that holds true in cases in which both ovaries have been removed during the first three months of pregnancy?

Dr. Barrett: I cannot say just the percentage, but both ovaries have been removed in cases that were not far enough along so that they supposed they were pregnant, and yet they went on to full term. According to experimental

evidence we would think that the earlier removed, the less the chances of going on.

DR. CURTIS: Have you ever seen instances of that kind? It has been experimentally and clinically demonstrated, at least to my satisfaction, that pregnancy cannot go on if the corpus luteum has been removed before the third month of pregnancy — that is, before the third month has elapsed.

DR. BARRETT: I don't think there is any answer, except that there is clinical evidence that it has been done before the third month. It might be said, and perhaps wisely, that there was a supernumerary ovary or a bit of ovarian tissue left, or a piece of ovarian shell on the broad ligament or that there was a little capsule of the ovary left on the uterus. Perhaps that could not be denied in these cases.

DR. ARTHUR CURTIS: The work which was done by Fraenkel demonstrated quite conclusively, to his own satisfaction and also to the satisfaction of almost everyone reading his work, that the corpus luteum is absolutely essential for the development of the fœtus during the first half of pregnancy in rabbits. This same thing has since been repeated by a number of investigators, and no one has been able to refute the arguments and findings which he advanced. I personally performed experiments of a similar nature, and in every instance in which the corpus luteum was removed during the first third of pregnancy abortion or absorption resulted. When one performed an operation under exactly similar circumstances and removed portions of the ovary, and did other operative procedures which were fully as traumatic as that of removing the corpus luteum, the pregnancy almost invariably went on to term.

DR. BARRETT: Dr. Berry, of Mount Clemens, a very reasonable man, told me that he removed both ovaries and tubes, and considered he did the operation very completely, when pregnancy was so short a time along that he did not consider the woman pregnant, and yet she went to full term.

DR. DANFORTH (closing): With reference to Dr. Webster's point, as to the sequence of the two operations, cæsarean section and removal of the tumor, I think doing the cæsarean first and removing the tumor afterwards is the logical order, and in my own case I did it that way. However, Hirst gives it the other way.

DRS. FRANK W. LYNCH and RALPH W. WEBSTER presented a paper on the "Total and Ammonia Nitrogen in Toxæmia of Pregnancy and Eclampsia, Based Upon the Study of Twenty Cases of Eclampsia and Ten of Preëclamptic Toxæmia." The curve of the urinary nitrogen in a normal case of pregnancy was charted for six of the last weeks of pregnancy in a case which was followed by daily investigations. (Paper to appear later.)

DR. R. W. WEBSTER: In view of the fact that our chief conclusion has been that the determination of ammonia has little significance, it would be well to explain our reasons for such conclusion, as well as to state what probably leads to variation in the ammonia output, normally. As Dr. Lynch has said, the subject of the ammonia output in the urine has received quite a shock from the study of the work of Folin. On a mixed diet the ordinary output of ammonia is from 4 to 5 per cent of the total nitrogen. Diminution of nitrogen in the food until you get up to a nitrogen-free diet will give an ammonia output as high as 20 per cent of total nitrogen. If this is the case, we can readily account for the ammonia increase in the toxæmia, and especially in the pernicious vomiting of pregnancy, because in these cases the patients have very little food, and are in a state of inanition. They are suffering, therefore, from a lack of nitrogen in the food, and the ammonia output will increase. At the same time with this ammonia increase it is necessary that you get, as a precursor of the increase in ammonia, acetone and diacetic acid. You cannot have the ammonia increased without.

Those are the points shown in one of the cases in which the acetone was not present at any time. the ammonia output being at the highest 3.67 per cent. This is the condition, that is, the presence of acetone and diacetic acid with increased ammonia, that is present in cases of diabetes and also in cyclic vomiting of children, and the toxæmia of pregnancy. However, in eclampsia you have an entirely different proposition. I don't know whether Dr. Lynch mentioned it or not, but you can by determination of the urinary output, especially the ammonia in the urinary output, distinguish between the renal and hepatic eclampsia. You can distinguish it perhaps as well by the determination of the albumin and casts, but you cannot always do it. If you assume that an increase in albumin is indicative of a renal eclampsia, why then should you get the increased ammonia percentage in some cases and not in others?

One point regarding the possibility of varying the ammonia not only by diet, but also by other means: As I said, the percentage of ammonia is increased by lessening the nitrogen intake. At the same time, the ammonia output is diminished

by the intake of alkalies. This is absolutely an essential fact in metabolism.

The work of Underhill a few years ago, as you probably recall, was taken up with the idea of showing that Williams' theory was correct, which was that if the ammonia output is 10 per cent or more of total nitrogen, you have a danger zone, and must begin treatment at once. When Underhill finished, he came to the opposite conclusion, that the percentage of ammonia cut absolutely no figure.

The percentage variations are what we have been working at for many years. Our work is, in a way, an addition to that of Underhill, only we go a little further and say that not only do the percentage variations of ammonia have no value in themselves, but are of no use in arriving at anything conclusive regarding the toxic condition with which we are confronted in eclampsia. Whether or not we will have to change this idea remains to be seen, but from the large number of cases we have studied up to the present time, it does not seem that that will be necessary. The ammonia coefficient is not now and will not be of any value in the work.

DR. CHARLES B. REED: I approach the discussion of these papers with great humility because I have done no work on the subject myself, and so far as I know the work that has been done is largely pioneer in character. I am deeply interested in the questions that the essayists have brought forward and I would seek further enlightenment rather than spend time in futile argument. I would like to have them explain one or two points which seem a little obscure to me. First, may I inquire what relation the nitrogen in the urine has to the presence or absence of a pernicious vomiting, or of an eclampsia? Also can they throw any light on the question of renal and hepatic eclampsia? I don't just understand the difference between these two forms, as they describe them, as to prognosis. This differentiation by origin is new to me and most interesting. Again, what relation the ammonia or nitrogen, or both, may have to either form of eclampsia? I would like to know, too, if the discovery or the detection of either nitrogen or albumin, or both, in the urine of the pre-eclamptic or pernicious vomiting case would influence in any degree the character of their diets or the method of treatment. Apparently, they have come to the conclusion that the detection of these substances is relatively useless as regards the condition or prognosis of the patient.

I would like very much to know if the gentlemen have concluded that the toxæmia which develops or expresses itself in an eclampsia is apparently the same toxæmia which expresses itself as a pernicious vomiting of pregnancy?

DR. W. A. N. DORLAND: I will add one point only to what Dr. Reed has asked; namely, the study of the blood-condition occurring *pari passu* with the condition of the urine, that is as to the degree of its toxicity and the abnormal constituents it contains.

DR. LYNCH (closing the discussion on his part): When we first took up this work, Slemon's very beautiful research on the nitrogen in the urine and fæces had just been completed. His patients were kept on a high but not excessive nitrogen diet, the amount of which was accurately measured. They were not kept in nitrogenous equilibrium. Under such circumstances the body gained nitrogen, as had been suggested by one earlier observer, Zacherewsky. Slemons charted the ammonia only in terms of percentage, yet calculation shows that it was also normal in absolute amount.

You will recall that texts on physiological chemistry at that time gave 33 grams of urea as the amount which should be excreted by the normal adult. We were still struggling with surprise that the urea in eclampsia was usually decreased to ten grams or less, when our routine investigations showed that twenty grams was normal for the pregnant woman at term when upon a full mixed diet. Yet we cannot be blamed for believing that the nitrogen of the ten grams or so of urea, apparently lost in the eclampsia cases, was in reality present in the urine as a lower form of oxydization than urea and that suitable investigation would show percentages of the various nitrogenous substances which were characteristic of eclampsia. The normal case was studied with this point in view. Our work and the fundamental work of Folin show us that such belief is in error. We made no effort to keep our patient on a nitrogenous equilibrium, or to measure accurately the food ingested, since observations of this type were already recorded in the literature. We were attempting to find tests of clinical value which could be applied in pregnancies of which the previous diet was unknown

While our work is unsuccessful from this point of view, it has been of value from other sides. As a result of it we are unable to agree with Stone, Ewing, Wolff and others who believe that the pernicious nausea and vomiting and eclampsia are but the extremes of one general pathological process. It is quite worthy of notice that no case of eclampsia under our observation has given

the urinary findings of a marked acidosis. Indeed the ammonia excretion has exceeded normal in but three of the twenty cases.

In answer to Dr. Dorland's question, study of the blood has not been fruitful. At one time we worked in this field studying hæmolysis and the complement, at the time when everyone was using the then new Ehrlich methods. In a fairly large series there was but one case which had hæmolytic power. She was otherwise normal. Our material was limited to pregnancy, normal, with albumin, and eclampsias. Tests were made for hæmolysis with the fœtal and maternal blood for the three divisions just mentioned, but without abnormal findings. The complement varied within normal limits. Several eclampsias were studied for the freezing point of the blood. This was found within normal limits. The alkalinity of the blood was studied in three cases. Two were normal, but the one presenting variation was thought to show an increase of alkalinity which might be charged to the normal error of the experiment.

In answer to Dr. Reed I will say that we divide our cases into hepatic or nephritic eclampsias according to the predominant lesion as shown in the urinary changes and the clinical history. For instance we believe the cases in which the albumin and casts rapidly disappear after convulsions are frankly of the hepatic type. These we expect to be acidoses. The urine in the nephritic type clears slowly. Often albumin persists six months or more. Suppression is more common in the nephritic type. The quantity of albumin is often very marked. One case showed 540 per cent of albumin by volume and it was necessary to dilute the specimen fifteen times before it could be read in the usual manner. The hepatic type very rarely is attended with suppression.

We have not meant to include the pernicious vomiting of pregnancy in this paper. We have spoken of it only as we have had to for the purpose of giving a contrast. We hope to show, and have to our own satisfaction shown, that contrary to the simple eclampsias there is an entirely different process, a marked acidosis, in the vomiting cases. We believe that in these cases the estimation of ammonia nitrogen is going to be followed by the very greatest help, whereas in eclampsia it is useless.

The toxæmia cases have more ammonia; that is, the ammonia is above the normal average limit, but we have other symptoms to guide us which are of more value. For instance, we have come to the very firm belief that it is useless to temporize with women who present albumin and casts in the urine for any considerable period of time. We believe that the sooner delivered, the safer you are as an obstetrician.

Dr. Webster (closing the discussion): I want to add one point to the remarks made by Dr. Lynch about the urea; namely, that we did not get the output looked for. It is quite common, I believe, for the profession at the present time to believe that 2 per cent of urea is the normal output. The output of urea must have reference to the output of total nitrogen. Hence, when you say 2 per cent you must know, if you are going to get any value whatever from the urea output, how much total nitrogen is excreted. You cannot know entirely about the urea unless you know the total nitrogen. A patient may have one-half per cent urea and still be a normal individual. The question of the urea output in relation to toxæmia has reference entirely to the question of total nitrogen output, and this again has reference to the diet, to a very large extent.

The nitrogen-free diet gives a low nitrogen output, and under these conditions you find the patient with eclampsia and pernicious vomiting with a low nitrogen output. Our cases usually ran 5, 6 to 7 per cent nitrogen, and the only way we could increase this was by increasing the diet.

In regard to the relation of the diet to the ammonia output: That is answered in the same way; namely, that the less nitrogen you give in your diet, the higher the ammonia output, and the nearer starvation you get your patient, the higher the ammonia output. So that this question of ammonia output is one that is largely influenced by diet as well as by the condition prevailing.

Just one other point, regarding the differentiation between renal and hepatic eclampsia. The hepatic type of toxæmia necessarily is associated with an acidosis, as Dr. Lynch has said. You cannot have any hepatic eclampsia or toxæmia without having an acidosis. This acidosis is necessarily associated with an acetonuria and diaceturia. When ammonia is high there is acetone and diacetic acid. With renal eclampsia there is no acetone and diacetic acid. The ammonia may be low, due entirely to the lack of nitrogen in the diet. If on a normal diet you get renal eclampsia, you will find acetone and diacetic acid negative, and urinary signs of renal trouble: albumin, casts, and œdema. With the hepatic eclampsia you have closely associated toxæmia, giving acetone, diacetic acid, and high ammonia output. You can differentiate them sharply for these reasons.

BOOK REVIEWS

A CRITIQUE OF NEW BOOKS IN SURGERY

By MAJOR G. SEELIG, M.D., St. Louis, Missouri

SOMEHOW or other it does not seem to matter much how varied the contents of a given group of books may be, there is an indefinite something that unifies them in spite of their differences. Sometimes it is the similarity of fields covered, sometimes it is a high level of excellent style, possibly a particular clarity of exposition or smoothness of diction, and sometimes the virtues of one book serve to group it by contrast with a number of more or less inferior sister and brother volumes. The books on the review table illustrate this most strikingly this month. There are four or five volumes, all of them, it is true, dealing with closely allied subjects, and all of them more or less alike, yet not alike so much because they cover similar fields as for the reason that they all stimulate what may be called the sense of possession. None of them is indispensable, none of them promulgate new themes or teach new lessons. Indeed, most of them are new editions of old works; and yet one thumbs the pages of each volume with the unexpressed thought in mind, "Ah! I'm glad to have this." It is a month that strikingly confirms the time-worn comparison of books with friends — our chief joy flows from the fact that we possess them, rather than from the possibility of using them.

A book on war surgery — surely this is nothing to be placed on the active list of a civil surgeon who, pray God, will never be called by his country. The ninth edition of a manual of surgery, a standard classic, else it would not be in its ninth edition; but mind you, it is nevertheless a ninth edition, and cannot therefore be totally different from its immediate predecessor. The third edition of an abdominal operative surgery, by a master. Even a master, however, cannot, in the third edition, add much glory to the first. And finally a bulky work on operative surgery with appealing, attractive format, but more or less conventional contents. All this, on the face of it, does not seem to be a very flattering epitome; but each volume makes its own strong appeal, and one simply cannot help experiencing the "Ah! I'm glad to have this."

THIS brochure on war surgery by Edmond Delorme[1] is just the thing one needs to stand up alongside of Lagarde and Makins. The three books make a fairly thorough digest of recent war experiences. And they are valuable even to him who prays for eternal neutrality. Not the least interesting phase of the little volume is its genesis. Delorme states in his preface that he planned and wrote it after the unexpected declaration of hostilities in Europe, during odd moments snatched from the active duties of war. Certainly it is true that the book represents the "latest style" in war surgery.

One marvels at the completeness of the work, considering the stress under which it was done. There are twenty chapters, most of which, the author tells us, were written from memory, describing the various arms in use, and their respective projectiles, the types of injuries to the various tissues, lesions of blood-vessels and nerves, foreign bodies in wounds, injuries to bones and joints, complications of wounds (suppuration, phlegmon, tetanus, and gas gangrene), amputations, injuries to the head, face, neck, chest, abdomen, lumbar region and kidneys, bladder, spinal cord, and extremities.

In essence, there is not much discrepancy between what Delorme says and what has been said by either Makins or Lagarde. Possibly the most interesting topics discussed are those of high velocity bullets, the expectant treatment of injuries, and the newer treatment for gas gangrene. Delorme punctures the fallacy of the so-called "humane" high velocity bullet of war, and from his description of the effects of these high velocity missiles one can readily understand the various incriminations and recriminations on the part of Germany and France regarding dum-dum bullets. Under certain conditions, these bullets literally tear men to pieces.

It will take civil surgeons a long while to appreciate how much the field surgeons accomplish by their conservatism. For penetrating wounds of the abdomen Delorme italicizes the dictum, "*la laparotomie immediate est à rejeter.*" He quotes a mortality rate of only 50 per cent in penetrating abdominal wounds, when the wounded were not subjected to laparotomy.

For gas gangrene Delorme says that if practiced early, free incision with liberal use of hydrogen peroxide and a 4:1,000 permanganate solution, serves to abort the infection. If the infection has gained any marked headway, amputation must be resorted to. There is no mention of the subcutaneous use of hydrogen peroxide, although this partic-

[1] Précis de Chirurgie de Guerre. By Edmond Delorme, Medecin Inspecteur Général de l'Armée. Paris: Masson et Cie, 1914.

ular method was highly recommended a few weeks ago in current literature.

I like Delorme's little book, and I am glad to own it.

THREE years have elapsed since the eighth edition of Rose and Carless[1] appeared. In revising the old volume, Dr. Carless shows no strong reactionary or revolutionary tendencies. New illustrations, a few new colored plates, a full discussion of salvarsan and radium, and a new chapter on heat, light, and electricity have been added. Carless explains that he hopes these changes will help make the volume more useful, and then he adds what to me are the most interesting lines of the book, the short prayer, "that when the tenth edition is required, the sounds of war and strife which boom on the ear as these lines are penned, may long have ceased, and that a righteous peace leading to a happy competition of race with race in the effort to promote, not destruction, but the welfare of mankind of all nationalities, may have been established."

For years I have noted a strong preference on the part of students for Rose and Carless' book. This is the highest commendation that could possibly be accorded the work. The fullness and balance, the clearness, the subtle power of appeal to students, the excellence of classification and withal the keeping within bounds are responsible for the well merited success.

The book is much too well known to start in at this late day to detail its contents. We may hope, however, that when the smoke of battle has cleared and the tenth edition makes its appearance, Carless will expound more fully the subjects of Ludwig's angina, local anæsthesia, and the tuberculin and heliotherapy treatment for surgical tuberculosis. It might be well also to include a few words regarding the inguinal approach to femoral hernia, or, at least, to emphasize the difficulties sometimes encountered in the thigh approach.

Unless the unexpected happens, Rose and Carless and Da Costa will continue to preëmpt the field of one volume surgeries for students. And in closing, one may add that even the seasoned practitioner and teacher may often and with surprising advantage consult both these volumes.

THE book on "Operative Surgery" by Taylor[2] has been characterized by an English reviewer as a large and handsome volume. That it is, and it is expensive too, costing as it does seven dollars and a half. The English reviewer might well have added the adjective "selective," for Taylor treats only those operations which are most frequently performed in the head, neck, thoracic and abdominal regions; furthermore he has described only those operations which in his own experience he has found to be most practical and satisfactory. The author tells us all this in his preface, and, in the very telling of it, disarms the critic, for the simple reason that no one may cavil at the choice of an operator whose experience fortifies his choice.

There are four sections devoted to Surgical Technique, Head and Neck, Thorax, and Abdomen. Under section two, the various operations on the skull, mastoid, jaws, sinuses, lips, palate, tongue, pharynx, larynx, œsophagus, lymph-nodes, and thyroid are described. Under section three are included only cancer of the breast, empyema and pericardium. Under section four are included hernia, an extensive discussion of stomach surgery, the appendix, intestinal resection, malignant disease of the colon, the rectum, hæmorrhoids, bladder, kidneys, ureters, prostate, penis, scrotum, testicles, and spermatic cord.

One cannot commend too highly the method adopted by Taylor in his descriptions of operative procedures. With typically English clearness he describes every step, from incision to final suture and he has had all these steps illustrated by notably excellent cuts, both in line and color drawings. One notes merely in passing that he uses a transverse incision in his subtemporal decompression. Many American operators have a well-grounded preference for the vertical incision. No mention is made of Dowd's operation for cancer of the lip. We feel sure that Taylor would find it satisfactory enough to incorporate it in the text, if he could be persuaded to try the method. There is a natural sense of surprise at finding no mention of the very popular operation of Owen, the Englishman, for harelip. The one instance in which the author should have been most specific in his details regarding closure, namely, cancer of the breast, he has slurred over in a few lines. But there is no profit in such analysis, for, after all, Taylor tells us that he furnishes us with methods which he himself has found good and trustworthy. It is an unqualifiedly good book to have, if for no other reason than to be able always to consult Taylor's preferences.

THERE is not enough change in this new third edition of Moynihan's[3] book on "Abdominal Operations" to warrant any specific additions to the former reviews that we have published. The author had added just enough new material to necessitate dividing the work into two handy volumes, and this in itself is a decided advantage, for the old one-volume edition was almost too bulky for comfortable handling.

Since the appearance of the last edition there has been rather active agitation for and against the routine performance of gastro-enterostomy in the treatment of perforated gastric and duodenal ulcer. It is interesting, therefore, to note Moynihan's views on this subject. He recognizes the advantages of gastro-enterostomy in permitting a more assured

[1] MANUAL OF SURGERY. By William Rose, M.B., B.S. (Lond.), F.R.C.S., and Albert Carless, M.S. (Lond). F.R.C.S. Ninth Edition, revised by Albert Carless. New York: William Wood & Co., 1914.

[2] OPERATIVE SURGERY. By Edward H. Taylor, M.D., B.S., F.R.C.S.I. London: J. & A. Churchill, 1914.

[3] ABDOMINAL OPERATIONS. By Sir Berkeley Moynihan, M.S. (Lond.) F.R.C.S. Third Edition. Philadelphia and London: W. B. Saunders Company, 1914.

closing of the ulcer, and the early administration of food, and at the same time guarding against recurrence of the ulcer, or the development of a second ulcer. Nevertheless he adds that his experience has shown that the routine performance of gastro-enterostomy in cases of perforated ulcer is unnecessary. "Gastro-enterostomy is only to be done in those cases where an obstruction is present or is likely to develop from the closure of the ulcer, or where a second ulcer is seen." This is terse and fairly dogmatic counsel, which carries the weight of high authority.

The second volume opens with a new and excellent chapter on the surgery of the large intestine. The anatomy of the colon is first discussed very fully, and then the various regions of the colon are described in detail and very clearly. The positive axiom is laid down, that "of one thing there can be no question, in cases of acute obstruction (due to neoplasm) no attempt to resect the growth and to perform an immediate restitution of the canal is justifiable. The immediate indication is to afford relief, and the surgeon should never be persuaded into doing more than that."

One cannot help wondering why Moynihan does not discuss resection of the rectum. In the preface we are told that the kidneys and bladder were omitted from consideration because they are only partially intraperitoneal; possibly this same reason governed the author in his decision not to include the rectum as coming within his scope. This is a pity, because so few books contain an adequate description of the operations for carcinoma of the rectum. Such a description as Miles contributed to the *British Journal of Surgery* last October ought to be incorporated in every good book on intestinal surgery.

One could hardly be satisfied with a second edition, knowing that this third edition is out; so again the sense of possession asserts itself, even though the newer work is not manifestly altered in principle or scope.

BOOK REVIEWS

Books received are acknowledged in this department, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

TEXTBOOK OF SURGICAL OPERATIONS. Illustrated by clinical observations. For physicians and students. By Professor Fedor Krause, in association with Emil Heymann, M.D. Translated into English and edited by Albert Ehrenfried, A.B., M.D., F.A.C.S. Six volumes. New York: Rebman Company, 1914.

MEDICAL NURSING. By A. S. Woodwark, M.D., B.S., (Lond.), M.R.C.P. (Lond.) New York: Longmans, Green & Co.; London: Edward Arnold, 1914.

THE CLINICS OF JOHN B. MURPHY, M.D., AT MERCY HOSPITAL, CHICAGO. Vol. III, No. 6, December, 1914. Philadelphia, and London: W. B. Saunders Company, 1914.

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES, FOR THE FISCAL YEAR 1914. Washington: Government Printing Office, 1914.